

# MODERN SCIENCE AND CHRISTIANITY

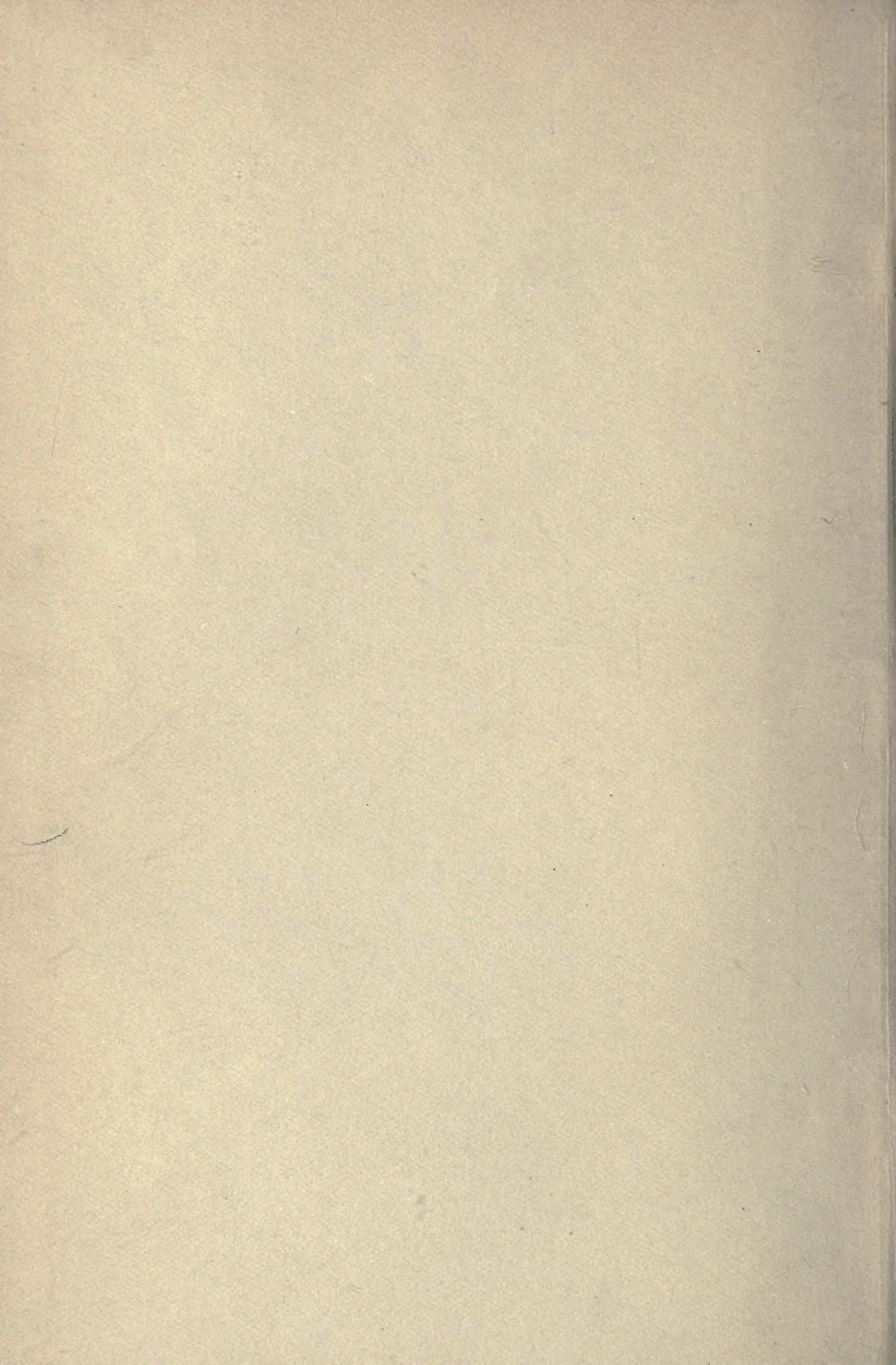
PROF. F. BETTEX \* \* \* \*

Translated by . . . . .  
EDMUND K. SIMPSON M.A.












MODERN SCIENCE AND  
CHRISTIANITY



Digitized by the Internet Archive  
in 2008 with funding from  
Microsoft Corporation



Relig.

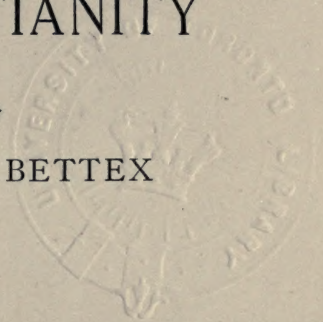
# MODERN SCIENCE AND CHRISTIANITY

BY

PROF. F. BETTEX

*Translated from the German, with Additions and Notes, by*

EDMUND K. SIMPSON, M.A. OXON.



95068  
2/3/09

LONDON  
MARSHALL BROTHERS  
KESWICK HOUSE  
PATERNOSTER ROW, E.C.

1903



BUTLER & TANNER,  
THE SELWOOD PRINTING WORKS,  
FROME, AND LONDON.



## AUTHOR'S PREFACE

THIS work is the outcome of a conviction, born of long-standing acquaintance both with nature and modern scientific literature, that it is more than ever needful to exhort many educated Christian people, whose minds have been troubled and their faith perplexed by the alleged conflict between nature and revelation, faith and science, not to suffer themselves to be thus alarmed. If there is a God, nature is His handiwork. The Creator and His creation cannot stand in contradiction. With all the advances of science, a Biblical and Christian philosophy remains not merely possible, but also truer and more adequate than any materialistic system, however bold its front and wide its dissemination. Test that for yourselves, my readers, with due deliberation ; and you will find how little truth or wisdom underlies the loudest and most current catchwords of the adverse party. God is still the Centre, Light and Sun of the world, in Whose light we see light ; and before that eternal radiance the faint and fitful tapers of human wisdom pale and wane.

A perfect knowledge, we know well, is not granted to any here below ; yet a Christian may, and should in all humility, seek to know, and to communicate freely to others what he himself has learnt. Such has been my aim. In conclusion, I cordially yield to each reader that same liberty of opinion which I claim for myself, only asking them to examine and to consider, and then draw such conclusions as they shall deem right.

F. BETTEX.



## TRANSLATOR'S PREFACE

THE ensuing volume, translated, with slight omissions, from the seventh German edition of *Naturstudium und Christentum*, is commended to the English reader in the hope that the welcome it has met with abroad will be extended to it in this country. Its main purpose is to take a rapid survey of the more prominent features of Modern Science, and to assert the concord that exists between genuine Science and genuine Christianity. A few passages have been drawn from the author's French adaptation of the work ; and Prof. Bettex has kindly permitted me to use my discretion in adding some clauses and paragraphs from his recent books, *Natur und Gesetz* (5th Ed.), *Das Wunder* (4th Ed.), *Die Symbolik der Schöpfung* (4th Ed.), *Das Lied der Schöpfung* and *Die Bibel Gottes Wort*. I am bound also to express my deep obligation to Miss Mary Huntley, whose prior translation (published in America), of which I was unaware till I had nearly finished mine, I have had the advantage of consulting, and who has most

unselfishly urged me to complete the present version. In order to justify this edition and render it more useful, I have supplied classical and other references where they could be traced, and added notes. At the author's desire, I have also illustrated the text by English quotations, with the aim of *anglicizing* the work. For these additions I take full responsibility.

There are a few matters in these pages regarding which, no doubt, there will be differences of opinion. It may be said for example that the leavening and expansive, recuperative and reflex influences of Christianity are not enough allowed for in the author's view of actual and possible progress. But it should satisfy every candid dissenter from his interpretation of prophecy, or occasional mystical leanings, that Prof. Bettex has disclaimed any desire to trench on private judgment; and he is far too sincere in his homage to truth to value a mere indolent acquiescence in his opinions, and too well able to defend them to apprehend an encounter with any of his challengers.

As to the strictures incidentally passed on that Rosicrucian brotherhood, the Higher Critical fraternity, they



speak for themselves. The mind that capitulates to the monstrous sophisms of the critical mystagogues must be egregiously gullible. But the moral aspect of the question is the most serious. These credulous doubts, where doubts are, in Burke's phrase, decisions, sound strangely on the lips of Christ's professed disciples. There is such a thing as betraying the Son of Man *with a kiss*; but the fact that it is the act of an apparent friend dyes the crime with a stain of treble infamy. The levity that can make a plaything of the Divine Names and the Divine Law converts a theological chair into the seat of the scoffer, and deserves no quarter. These are assuredly not the works of "Abraham's children"; for they walk in the steps of the patriarch's faith. Revelation intact is their impregnable Acropolis: an amputated Bible is that Acropolis dismantled.

Yet if Professor Margoliouth is right in regarding the recovered Hebrew text of part of *Ecclesiasticus* as a late forgery, the whole European critical Sanhedrin have been trapped in the snare, and "committed the most serious error that had ever been made in the dating and analyzing of documents."<sup>1</sup> In which case the hectoring pretensions

<sup>1</sup> *Lines of Defence of the Biblical Revelation*: p. 279.

of these "chartered libertines," who are not above making "solemn pretence of receiving *ex animo* creeds which are only submitted to reluctantly as a condition of office,"<sup>1</sup> deserve to be exploded amid peals of irrepressible laughter not unmixed with scorn.

The translator has striven to make his author speak standard English, even at the cost of some deviations from a literal rendering. How far he has succeeded it is for his readers to judge.

EDMUND K. SIMPSON.

*March 31, 1903:*

<sup>1</sup> This is not a confession of some adept in Escobar or Suarez, but of the late Prof. Bruce!



# CONTENTS

## CHAPTER I

PAGE

### *TRUE PROGRESS OR NOT?*

I. COMPLEXITY OF THE FACTORS—	
Spectacle of the Earth's Imperceptible Flight . . . . .	1
And Brevity of Human History . . . . .	3
Yet Crowded with Events . . . . .	4
Gratuitous Assumption of Uniformity of Nature . . . . .	6
Our Ignorance of the Goal of the Universe and of Nations . . . . .	8
II. QUESTIONABLE PROGRESS—	
Deceptive Comparisons . . . . .	10
Magnificence of Ancient Empires in Part Unrivalled . . . . .	14
Shifting Civilizations . . . . .	20
Doubtful Modern Superiority in Language . . . . .	23
Happiness . . . . .	24
Verdict of Religion . . . . .	26
III. PRE-HISTORIC MAN—	
Recency of the Human Race . . . . .	27
Co-existing Stages of Culture . . . . .	1 <i>b</i>
Skull-formation no Clue . . . . .	30
Man and the Mammoth . . . . .	32
Antediluvian Titans . . . . .	33
Leadership of Race Allotted to a Small Minority . . . . .	35
IV. CHRISTIANITY AND MATERIAL PROGRESS—	
No Function of Social Amelioration . . . . .	36
A Spiritual Power Adverse to External Forms . . . . .	37
Nominal Christianity Ineffective . . . . .	40
Man's Perversity to Blame for the World's Condition . . . . .	42
Biblical Progression . . . . .	44

## CHAPTER II

### *THE DEVELOPMENT OF MODERN SCIENCE*

I. ACTUAL PROGRESS—	
Abnormal Condition of Fallen Human Nature . . . . .	48
Successive Unfolding of Principles of Good and Evil . . . . .	50
And of Far-reaching Ideas . . . . .	51
Creative Advance . . . . .	52
Study of Nature Allotted to Man . . . . .	54
Signs of Ennui Visible . . . . .	55
Yet New Themes Furnished by the Divine Disposer . . . . .	56

	PAGE
II. PROCESS OF UNIFICATION—	
Based on Nicety of Mensuration . . . . .	57
Numerical Relations basis of Modern Science . . . . .	58
Yet not therefore Prosaic . . . . .	59
Exemplified in Modern Ironclad . . . . .	60
Search for Common Principles . . . . .	62
The Elemental Atom . . . . .	1b
Matter and Motion . . . . .	63
Chemical Affinities . . . . .	64
Periodicity of Elements . . . . .	1b
Their Groups and Indestructible Characteristics . . . . .	65
Size of Atoms . . . . .	67
Molecules or Distributed atoms . . . . .	68
Theories of Atomic Phenomena . . . . .	1b
Various Degrees of Resistance to Disintegration . . . . .	71
Inadequacy of the Theory of Atoms . . . . .	73
Interchangeability of Forces and Sensible Impressions . . . . .	74
Conservation of Energy . . . . .	75
No Vacuum in Nature: Theory of Interstellar Ether . . . . .	1b
Correlation of Worlds . . . . .	76
Spectrum Analysis . . . . .	77
Exactitude of its Analysis . . . . .	78
Röntgen Rays . . . . .	79
Unity of Creation . . . . .	1b
Interaction of Worlds . . . . .	81
Book of Light a Record of the Past . . . . .	82
Natural and Moral Laws Ubiquitous . . . . .	83
Convergence of Elements . . . . .	84
Vegetable and Animal Cells . . . . .	86
Bacilli . . . . .	87
Approximation to Unity, and to Mystical Theories . . . . .	88
Discovery and Civilization . . . . .	90
Use and Abuse of Paper . . . . .	1b
Steel . . . . .	91
Metals the Vehicles of Force . . . . .	93
Its Storage . . . . .	94
Electricity . . . . .	95
Electrolysis . . . . .	96
Caloric or Solar Heat, the Central Fount of Energy . . . . .	97
III. FORECAST OF THE FUTURE MATERIALLY CONSIDERED—	
Intercommunication . . . . .	98
Travelling Villas and Trunk Lines . . . . .	99
Ocean Streets . . . . .	100
Watertight Yachts . . . . .	1b
Use for Military Forces . . . . .	102
Principle of Combination Extended . . . . .	103
Assimilation of Thinking . . . . .	106
And Language . . . . .	107
Utilitarian Education . . . . .	108
Decay of Family Life . . . . .	110



	PAGE
IV. A DARK BACKGROUND—	
Unrest . . . . .	111
Passion for Excitement and Enervation . . . . .	<i>Ib</i>
Evils of Cosmopolitanism . . . . .	112
Inferiority of Results . . . . .	114
Demoralizing Influence of Mechanical Labour . . . . .	117
And of Luxuriousness . . . . .	119
Yet we must admit Man's Real Greatness . . . . .	120
Grandeur of the Universe a Moral Tonic . . . . .	122

# CHAPTER III

## CHRISTIANITY AND SCIENCE

### PART I

I. MISTAKEN NEGLECT OF SCIENCE—	
Mischiefs Resulting: Loss of Insight . . . . .	123
Estrangement from the Community . . . . .	126
Unworthy Fear of Scientific Studies . . . . .	127
II. CAUSES OF THIS NEGLECT—	
Supposed Abstruseness of its Methods . . . . .	128
No Great Labour Needful to gain a Broad Conspectus . . . . .	<i>Ib</i>
Confusion of Fact with ensuing Theories . . . . .	133
Facts Cannot Prove a Negative . . . . .	134
Only Interpreted by Co-ordination . . . . .	<i>Ib</i>
Example in the Displacement of Spectrum Lines . . . . .	135
Affected by Bias, as at Present to Uniformity . . . . .	136
Illustrated by Geology and . . . . .	<i>Ib</i>
III. DARWINISM—	
Examination of it Needful . . . . .	138
Lamarck and Darwin . . . . .	<i>Ib</i>
True Limitations of Variation . . . . .	139
Theory Welcomed by Atheists . . . . .	141
But Contravened by Fixity of Type . . . . .	142
Appeal to Indefinite Lapses of Time not Permissible . . . . .	144
Decisive Evidence of Geology . . . . .	<i>Ib</i>
No Simultaneous Evolutions . . . . .	146
Transitional Forms Absent . . . . .	<i>Ib</i>
Unfavourable Verdict of Scientists, such as Liebig, Bischoff, Hamann, Vogt, Hensen, Quatrefages, Virchow . . . . .	147
Deep-sea Evidence . . . . .	150
Ape-speculation . . . . .	151
"Retrograde" Evolution . . . . .	153
Additional Note on the State of Opinion in Germany. . . . .	<i>Ib</i>
Caste and Evolution . . . . .	155
Denial of Personality . . . . .	156
Stability of Type Indispensable to Human Welfare . . . . .	157

	PAGE
Denial of Soul . . . . .	158
Demoralizing Influence of the Theory . . . . .	159
Congelation of Universe very doubtful Hypothesis . . . . .	160
IV. FANCIED ANTAGONISM BETWEEN MIRACLES AND SCIENCE—	
Knowledge to be Sought . . . . .	162
Obscurity of the Term "Natural" . . . . .	165
What Miracle is . . . . .	166
Absurdity of Denying its Possibility . . . . .	<i>Ib</i>
Our Nescience of "Natural Law" . . . . .	168
Miracle Beyond the Range of Science . . . . .	169
Implied in Theistic Belief . . . . .	171
Subject to its Proper Laws . . . . .	172
Wrought for Man's Sake . . . . .	<i>Ib</i>
Miracles of Materialism . . . . .	173
Creation Essentially Miraculous . . . . .	174
The Belief Universal . . . . .	176
Appeal to Moral Sense . . . . .	177
Inseparable from the Bible . . . . .	178
But a Vexation to Nominal Christians . . . . .	179
Person of Christ the Chief Miracle . . . . .	181
The Folly of not Counting the Cost of a Christian Profession . . . . .	182

## PART II

## THE BIBLE AND NATURE—

Creation . . . . .	185
All Truth essentially Important . . . . .	186
Objection of "Unscientific Language" . . . . .	187
Examination of Genesis i. by the Light of Geology . . . . .	<i>Ib</i>
Purposed Alliance of Man with Nature . . . . .	193
As in the Mosaic Law and Jewish Theocracy . . . . .	194
Grievous Harm done to Christianity by Attempt to Discard "Judaism" and "Dogma" . . . . .	199
Natural Phenomena in the Old Testament . . . . .	204
Natural Phenomena in the New Testament . . . . .	208
Accord of the Bible with Science . . . . .	211
Denied for Moral Reasons . . . . .	212

## CHAPTER IV

## SCIENCE: A CRITICISM

## I. ITS LIMITATIONS—

Honour Due to Knowledge, though Imperfect . . . . .	215
Science a Medley of Truth and Speculation . . . . .	217
Requiring to be Criticized . . . . .	219
Its Ultimate Grounds indemonstrable . . . . .	220
As in Mathematics . . . . .	<i>Ib</i>
And Physics . . . . .	221
And Astronomy . . . . .	222
Obligation to <i>Believe</i> . . . . .	223

# CONTENTS

XV

PAGE

## II. ITS INSTRUMENTS—

The Five Senses . . . . .	224
Reality of their Testimony . . . . .	<i>Ib</i>
Yet Defective in Range compared with Animals . . . . .	225
Limit Science . . . . .	229

## III. INSOLUBILITIES—

Dubois-Reymond on this Theme . . . . .	230
Conditions of Time, Space and Number Inscrutable yet not Subjective . . . . .	233
Science cannot Penetrate Essences of Things . . . . .	241

## IV. FOIBLES OF SCIENCE—

Technical Language . . . . .	242
Ambition to be Clever . . . . .	244
Pretence to Infallibility . . . . .	245
Examples of Scientific Error: Meteorites, Double-stars, Deep Sea Life, etc. . . . .	<i>Ib</i>
Rejection of Things Not Understood . . . . .	248
And of the Supernatural . . . . .	251
Yet no Lack of Modern Superstition . . . . .	<i>Ib</i>

## V. ITS CRITICAL PRETENSIONS—

Ludicrous Self-assurance . . . . .	253
Braggart Claims Baseless . . . . .	254
Forecast of Criticism of 3000 A.D. on the "Goethe-Myth" . . . . .	256
And on Napoleon and Bismarck . . . . .	260
"Higher Criticism" a general Scepticism of the Past, and Assumption that "all Men are Liars". . . . .	262
Such Falsehood of History Incredible . . . . .	263
That View Answered by Progress of Excavations . . . . .	264

## VI. ITS CIRCUMSCRIBED DOMAIN

Not Indispensable . . . . .	<i>Ib</i>
Nor of Moral Benefit . . . . .	266
An Intruder in the Spiritual Realm . . . . .	268
Folly of "Popular Science" . . . . .	269
Hollowness of Much Modern Education . . . . .	270

## VII. ITS CONSISTENCY WITH CHRISTIAN FAITH—

Services of Christian Men to Science . . . . .	272
Their Testimony . . . . .	273
Not that of Fanatics . . . . .	276
Power of Christianity Indisputable, Unexplained except by its Truths. . . . .	277
Strength of Islam the Ingredient of Truth in it . . . . .	278
Facts of Christianity Demand an Adequate Cause . . . . .	279
Faith a Necessity . . . . .	282
Its Power . . . . .	283
Christianity explains the Condition of the World as no other Philosophy of life does . . . . .	<i>Ib</i>



## CHAPTER V

## MATERIALISM

## I. CANNOT EXPLAIN PHYSICAL PHENOMENA.—

Materialism a Speculative Creed of Negations . . . . .	287
Eternity of Matter an Inconceivable Dogma . . . . .	290
Incompatible with Evolution . . . . .	<i>Id</i>
Eternity of Forces Untenable . . . . .	294
Life and its Origin Unexplained by it . . . . .	296
Consciousness Inexplicable by Psychology . . . . .	300
"Atomic Consciousness" a Gross Incredibility . . . . .	301

## II. CANNOT EXPLAIN MORAL PHENOMENA.—

Baffled by the Mystery of Death . . . . .	305
Its Pessimistic and Immoral Issues . . . . .	310
Cannot Explain Genius . . . . .	312
Its Vulgar Ideals and Apathy towards Nature . . . . .	314
Denial of Purpose and Co-ordination . . . . .	317
Incapacitated for Art and Poetry . . . . .	320
No Solution of Love, Faith and Hope, mighty as have been their Achievements . . . . .	323
Or of the Universal Phenomena of Ethics . . . . .	328
Utility no Criterion or Elucidation of Conscience, Re- morse, etc. . . . .	331
Its Attacks on God may be Retorted on Itself . . . . .	334
Frenzy against Religion Irrational . . . . .	336
Ought to be Indifferent to it . . . . .	337
Barrenness of Materialism . . . . .	339
An Inadequate System . . . . .	340
At War with our Primary Feelings . . . . .	341
Prevalence of its Spirit . . . . .	345
Yet Cannot be Universal . . . . .	346
A Morbid Growth, Ending in Disaster . . . . .	347

## CONCLUSION—

Accord of Christianity with Life and Science . . . . .	348
--	-----

## CHAPTER I

### True Progress or Not ?

Science advances with gigantic strides :  
But are we aught enriched in love and meekness ?  
Aught dost thou see, bright Star ! of pure and wise  
More than in humbler times graced human story ;  
That makes our hearts more apt to sympathize  
With heaven, our souls more fit for future glory ?

WORDSWORTH : *Sonnet to the Planet Venus.*

#### I.—COMPLEXITY OF THE FACTORS

MOTIONLESS is the aspect of this earth to us, and majestically placid. Whether we are surveying from the vantage-ground of a high mountain-peak far-stretching savannas or dark belts of forest, with here and there a river meandering in the mid-distance, or scan from some tall promontory a shoreless ocean spread out in broad expanse before us, with tiny sails like white dots fluttering in almost imperceptible motion over its deep-blue surface—still, even as in the days of Homer, earth, “ the nursing-mother of mankind,”<sup>1</sup> seems to slumber fixed and tremorless. And the life spent upon its surface by the *majority* of the race is hardly less serene and unperturbed. Sequestered from the feverish turmoil of cities, there are millions who day after day till with ungrudging labour the same soil that their forefathers ploughed up before them, and dwell contentedly in the cottages that their ancestors built, spectators of the annual recurrence of summer and winter, seed-time and harvest,

<sup>1</sup> We are not quite certain to what exact phrase the author here alludes ; but we presume it to be one of the frequent epithets of the kind, such as βωτιάνειρα, πολύφορβος, ζείδωρος ἄρουρα. (E.K.S.)

## 2 MODERN SCIENCE AND CHRISTIANITY

and of their children's advance in growth ; and so their life ebbs away monotonously and in peace.

But, in reality, and as viewed from the heights of eternity, this globe is anything but calm or motionless. No ! the planet on which we reside, with its twin poles and frozen oceans, its continents and seas, hastens, flies, shoots without one momentary pause through illimitable space ; while its satellite the moon, a petrified world of rocks and craters, spins round it in wide circles, itself the while in yet wider orbit circling the sun, which in its turn speeds on its path through the universe—whither we do not know. During a single advance of a second's hand, our earth, and we with it, have flown eighteen miles farther, never to return again to that spot in space which we are now occupying. If the Almighty, who only is the Centre of rest,<sup>1</sup> were to permit us a fixed standing-point in His ever-revolving universe, from which we could view this world, what should we perceive ? We should see a small star, at first all but indiscernible, increasing rapidly in brightness, and soon looming as large as our moon. In two hours' space it would cover half, then the whole of the hemisphere : and the earth would dart by, a vision of appalling grandeur, leaving the lagging cannon-ball far in its rear. For a few minutes sunlit plains and tempestuous seas would whirl in succession past our amazed and dazzled eyes, sandy deserts interchanging with snow-clad ranges, lonely forests with populous cities ; quiet landscapes, sullen gorges and murky banks of clouds, all sweeping by with inconceivable rapidity. Before we had recovered from our bewilder-

<sup>1</sup> Cf. the fine lines of Wordsworth :—

Authentic tidings of invisible things,  
Of ebb and flow and ever-during power ;  
And central peace subsisting at the heart  
Of endless agitation.



ment and fright, the pictures would be fast fading out of sight ; continents and seas would quickly dwindle to dark or bright spots, and the great sphere become visible once more, a swiftly diminishing magnitude retreating farther and farther from us, soon to reassume the dimensions of a minute star pursuing its prescribed orbit, propelled by a divine afflatus through the abysmal chasms of infinite space. Nevertheless, an entire world would have glided past, with all its agglomerations of matter and organisms, with the woes and joys, the crimes and guilt of fifteen hundred million human souls made in the divine image, each of whom shall outlast the globe itself ! Truly, a spectacle not unworthy of immortal eyes !

This world precipitates itself through the abyss of space ; but the human beings that inhabit it career through that other abyss of time, emerging out of one soundless eternity that they may plunge into another equally mysterious. Where were they ten thousand years ago ? Yet such an interval is scarcely one day of that solar year which numbers thirty millions of ours ; a mere second in celestial chronometry. Since then the lovely star Vega has advanced hardly half the breadth of the moon's diameter in its immeasurable orbit. When another such second on the great dial of the heavens has reached its terminus, where will the present human race be ?

Brief indeed is our existence. Every lump of coal that is placed on your fire is the residuum of trees which grew upon the earth ere angel or seraph comprehended what man was ; for the soul of Adam yet lay uncreated in the depths of the divine Mind ; and God had not yet said, " Let Us make man in Our image ! " From the day, six thousand years ago—for not *one* monument or work of human hands is known that can be proved to be older than that—when Adam opened his amazed and ravished eyes upon a life of blessedness in that garden that God had

planted, to the birth of Christ, only threescore and fourteen human generations had succeeded one another on the face of the globe (Luke iii. 28-38). According to the scale adopted by Herodotus, from that day to the present year (1903) some fifty-seven of these have passed by (1903 :  $33 \cdot 3 = 57 \cdot 15$ ) : that is to say, 131 in all, or in round numbers, only 140 individuals (viz., our collective forefathers in a direct line) separate you and me from Adam, and constitute our entire pedigree ! A small conclave, not one quarter of the British House of Commons, which might meet in any moderately-sized hall. Yet how venerable would those few representatives of the entire human race be ! Foremost of all, would stand forth the nine saecular giants of antediluvian days, who for 1500 years, in the amplitude of Titanic strength and overweening pride, filled the world with their violence ; next in order many a wild nomad chieftain, or founder and legislator of a state, with a sprinkling of minstrels and sages, interspersed with samples of beggary and foul criminality ; godless despots, honest peasants, sturdy toilers, proud chevaliers would all be there. How interesting would it be to have their autobiographies, the complete collection of which would form a biography of the human family itself. But let us have patience ! One day, amongst the wonders of eternity, we shall see them all, and view their past achievements, recorded in imperishable photography ; for nothing in God's universe is lost. The Egyptians long ago asserted that " the archives of the deities rest in ethereal space."

Yet however brief is human history, however properly a thing of yesterday, what an inconceivable and tremendous accumulation of acts, words and thoughts it has heaped up ! How much it has erected and demolished, planted and uprooted in this short space ! What a mass of things spoken, written, suffered and enjoyed, of sighing, laughter, lamentation, supplication, imprecation ! What kingdoms

and thrones have risen and crumbled, leaving no trace behind ; how many civilizations and nations been born and also buried ! Surely the whirling, swirling dance of the spirits of universal human history is even more impressive than the flight of the earth through fathomless space. Whole empires are built up with incredible haste, only that they may fall down, whilst men make " their exits and their entrances " momentarily upon the stage of life. In the space of ten years, the time that a boy spends at school, Alexander (that winged leopard which Daniel foresaw in the visions of God) burst into Asia with his mail-clad phalanx, smote into ruin the monarchy of Persia, pulverized the power of Tyre, founded on a sand-waste that city of Alexandria, even yet a seaport and mart of nations, vanquished and made presents of kingdoms, metamorphosing the surface of the earth like some tornado ; then vanished in his prime, and his universal empire set in blood.

An unknown Corsican lieutenant of artillery rose up a hundred years ago, and in a scarcely longer interval seized on supreme power, struck down his foes, marched over the earth with hundreds of thousands of soldiers, installing and deposing monarchs and fashioning a new order of things at his pleasure, until *his* power also suddenly collapsed, and he died in solitude on the rocky islet of St. Helena. Where are the kings—Louis, Murat, Joseph, Jerome—with their court-retinues and train of officials, whom he set up ? They have disappeared like so many visions. Where are the hosts that battled at Austerlitz and Leipzic, and marched at his behest to Russia ? Where the heavy-armed cuirassiers, whom the haughty Corsican sent to their deaths at Waterloo in that earth-shaking gallop, to rescue his tottering empire ? He and they alike are now shadows in " Sheol." Scarcely a handful of their dust survives above or beneath ground.

And have we not seen, only thirty years back, unex-



## 6 MODERN SCIENCE AND CHRISTIANITY

pectedly and to the surprise both of friend and foe, a mighty German Empire grow up almost in a night in the heart of bloodshed and mortal strife? Already, however, most of the men who staked their possessions and lives on that issue have sunk into the grave; a few years more, and not one will be left to tell the story of the struggle; for the withered leaves flutter ceaselessly down from the ash Ygdrasil, the fabled tree of life of Northern Sagas, and thousands bud forth in their stead.<sup>1</sup> Angels perpetually descend to this vibrating sphere, bringing hither still-slumbering infant souls, and cross others on their passage upwards, bearing many a Lazarus whose warfare is accomplished to Abraham's bosom. Ten thousand human beings are born and ten thousand die weeping and wailing betwixt each sunrise and sunset;—

“ Some who quit a scene of woes,  
Some a lulling dream who close,  
Some life-wearied, some new-born:”<sup>2</sup>

and many, oh, how many! are claimed by the angels of perdition as their quarry; for, transient as their earthly life has been, they have found ways and means to forfeit an eternity of bliss therein!

Contemplating each individual life, and that of mankind at large in this aspect, we repeat with Bildad: “ We are of yesterday, and know nothing; because our days upon the earth are a shadow ” (Job viii. 9); and are more than ever amazed at the arrogance of a creature like man, whose race had no existence yesterday, and will have vanished to-

<sup>1</sup> Sic rerum summa novatur  
Semper, et inter se mortales mutua vivunt :  
Inque brevi spatio mutatur saecula animantum,  
Et quasi cursores vitae lampada tradunt.—Lucr. ii. 75–9.  
(E.K.S.)

<sup>2</sup> Jacobi : *Litanei*.

morrow, who has not yet had time to get a correct notion of his dwelling-place, and of the circumjacent creation, who knows as good as nothing of the other myriads of orbs in the universe, or of that universe itself, not to speak of heaven and hell, in stoutly asserting and erecting into scientific decrees the postulates that "matter or the forces of nature are eternal;" "observation has *invariably* taught us": "a miracle has *never yet* taken place": "it is outside discussion that the laws of nature should ever change":<sup>1</sup> "the supreme Being has *never* visibly revealed Himself." This is much as if some variety of those ephemera, many of which only live one or two hours, were to assemble at the brink of a pond on the round leaf of a water-lily and listen reverentially to an admired orator, whilst he inculcated the "fact" that "there never had been a time when that immeasurable superficies of water had been dried up, nor when the vast vegetable formations in proximity to it had been sere and sapless; still less that this pond, their present abode, had ever been covered by a concrete, yet transparent mass, of which a superstitious myth recounted that it consisted of solidified water"; a statement appropriately greeted with loud laughter!

With what a scornful, or rather mournful and pitying smile, yet darkening into holy anger, must the "sons of God," who once viewed with jubilation the founding of this earth, those princes of the nations or council of "the watchers" whom Daniel saw (Dan. iv. 17, x. 5, 6), the cherubim and seraphim to whom the highest analysis of a Newton or the deepest thought of a Plato seem like the prattling of an infant, look down on this conduct of man! Surveying the ages, they see suns emerging from

<sup>1</sup> "No finite experience whatsoever can justify us in saying that there is *any* probability that the future shall coincide with the past in all time to come."

Prof. De Morgan : *On Probabilities*, c. vi. (E.K.S.)

starry nebulae as so many grains, and how these suns generate planets and moons, on which a thousandfold life circulates; and how at length, enfeebled and strewed over with a layer of dross, each gradually congeals, shining thenceforth with a murky red light: whilst they abide in immortal youth, for ever younger as the ages roll on! Well for us that such an eternal life is promised us too!

But, seeing that the earth courses in ceaseless flight round the sun, and the sun with it through space, whither, we ask next, does this unending voyage tend? People who have lived fifty years on our globe are already more than two thousand millions of miles distant from the spot where they first saw the light. That is the vast expedition of which all terrestrial journeys are but a faint image, and like all actualities full of meaning and import; yet its goal is totally shrouded from our view. Is our sun, in company with other suns, or alone, along with its decrepit planets that slowly ossify and fall into one another, also sinking in giant curves into outer darkness, where, as in Dante's *Inferno*, all things are numbed with cold; to a universe framed in everlasting ice?<sup>1</sup> Or does it wander on and on lost in infinity without an end, never nearer, never farther off than when God created it? Or does it soar like an eagle in ever-expanding circles through the solar clusters, past incandescent stellar nebulae, thither where perfect and still more perfect vitality and ever mightier forces pulsate? We do not know. The paths of suns are a theme too vast for earthborn minds.

The destinies of history, in its ceaseless progression, are no less concealed from our gaze. We know indeed that in the beginning God made the heavens and the earth, and that

<sup>1</sup> "The solar system is going through a process which in the course of ages will reduce it to a single and not very large mass of matter frozen up with more than arctic cold."

J. S. Mill; *Essays on Religion*. (E.K.S.)



in the end He will be all in all. But we do not understand the law by which empires rise and set in endless series ; why nations are constantly being born and becoming extinct :<sup>1</sup> nor why the history of the world revolves in mysterious circles round Jerusalem, the centre of the earth ; moving from Egypt to Assyria, then towards Syria and Palestine, and later centering in Greece, Rome and Carthage ; why it stretches out in modern times eccentrically to Germany, England and France ; yet soon, if all signs of the times do not deceive us, to revert again to the east, disregarding, in unison with the Biblical outline, whole continents such as America, Australia and China, as if in this respect insignificant. Why does the intellectual activity of the race congregate and crowd round certain centres (like Berlin, London and Paris), complaining all the while of overcrowded populations, though there are countries lying fallow and either wholly or largely depopulated, which once (e.g. Mesopotamia, Assyria, Syria, Egypt, North Africa) formed some of the richest, most populous and prolific tracts of the earth ? In former times, if a country became too closely packed, thousands moved onward under the conduct of some intrepid chieftain, and laid the foundation of a new home. Where is the leader to be found to-day who will bid the stagnating elements, the idlers and proletariat of a nation, or like Eric the Red its discharged criminals, follow him, to seek an open space on the wide surface of the globe, and to be a nation in their own native vigour ? We lack the requisite energy and fortitude, and have an excellent knack of palliating our weakness under the convenient phraseology of "other times," "altered circumstances," "poli-

<sup>1</sup> "For the lives not only of men but of Commonwealths and the whole world run not upon an helix that still enlargeth, but on a circle, where, arriving to their meridian, they decline in obscurity and fall under the horizon again." Sir Thomas Browne : *Religio Medici*. (E.K.S.)

tical difficulties," "want of capital," and what not. Were all these conditions at the command of former adventurers?

Wherefore is it that primitive tribes sicken and pine irremediably away, consumed, as it were, by some invisible bacillus, vanishing from the lands which are touched by the "civilization of Christendom"? This is happening to North American Indians, the Australian and Tasmanian aborigines, the Maoris of New Zealand, and will one day befall the negro tribes of Africa. Of none of these facts can we give the reason!

## II.—QUESTIONABLE PROGRESS.

Who is to decide whether all this is a sign of progression, retrogression, or a stationary condition of humanity? We are perfectly aware that the votaries of "advancement" are incessantly announcing with superfluous ostentation that we are greater, cleverer and more enlightened—they dare not say, "happier"—than any of our ancestors; and thousands of people applaud the dictum who know almost nothing of history, and are therefore incapable of forming any correct judgment of it. But every century, since man has been on the earth, has advanced a like claim, in virtue of the moral perspective which images objects in our immediate vicinity as great, and things at a distance as small. Many better instructed minds, on the contrary, have a presentiment that we are not making any genuine progress at all. With all our railroads, telegraphs, and joint-stock companies, repeating-rifles and torpedo-boats, and in spite of them all, prosperity, happiness and peace have not inaugurated their reign over mankind, nor is there any prospect of their doing so in the near future. With all the boasted advance of political science and administrative talent, theology and jurisprudence, the tide of socialism and anarchism still mounts, till it threatens to engulf society;

thrones and religions, beliefs and laws are rocking ; malefactors and wastrels multiply, and defy God and man ! Medicine is interminably chanting paeans over new " triumphs " ; and new " departures " in the theory of education are continually being paraded ; yet at the same instant we hear general lamentations over the growth of nervous and cerebral derangements, short-sightedness and anaemia ; the unintermitted decrease in the duration of life and capacity of physical endurance, together with the increasing insubordination and callousness of the young. The number of juvenile offenders in Germany rose in ten years from thirty to seventy-four thousand, according to Dr. Felisch. We find in this so-called " century of humanity " more and more fatal weapons, veritable instruments of torture, in process of construction ; so that in the next " inevitable struggle for empire " not merely some hundred thousands, but millions, will exterminate one another : in which case military experts warn us that the nursing of the countless roll of wounded combatants will be a sheer impossibility. In short, discontent and lawbreaking, swindling and cheating are on the increase ; hysteria, insanity, and, above all, suicide, are multiplying in an alarming ratio in this age of alleged " emancipation from palsying superstition," and of the onward march of humanity in the path of illumination and progress under the full noontide blaze of science. What a contradiction in terms !

As far as we can discover, the Egyptians and Aryans of four thousand years ago were as healthy, if not healthier, as dexterous and sagacious as we are ; like us, they were rich or poor, happy or unhappy, devout or godless, as the case might be ; logical in discourse, prudent in counsel, brave in action ; had their tastes in food and drink, their handsome houses and appropriate garb, their intelligent legislation, education and moral principles ; they bought



and sold, planted and builded, wooed or were wooed, hated and loved, lived and died as we do. When we read the earliest documents descriptive of the doings of the men of those days, we echo the exclamation of the Frenchman who cried, "*Tout comme chez nous !*"

The truth is, man in every age is still man. The Egyptian mother four thousand years since loved her little lad and was no less proud of him than the most aristocratic lady or humblest working-man's wife of to-day. Then as now, young people were active, athletic and high-spirited, and the old garrulous, grave, or morose ; then as now, lovers such as Sappho, Tibullus or Propertius, wrote sentimental stanzas to the object of their attachment. There were epicures and egotists, lofty and commonplace characters, the shrewd and the superficial, men of genius and dunces, entertaining people and withal bores in those days. Doubtless, they ate garum ; we take caviare : they drank Cyprian ; we drink Champagne : they dwelt in old, we live in modern villas : we frequent the theatre and Stock Exchange, they haunted the circus and forum. But of what significance are the respective fashions in dress, or the degree in which they stood in awe of their parents, as we of our spouses ? Solomon is our voucher that "there is nothing new under the sun. That which hath been, it shall be hereafter ; that which is done is that which shall be done again." The springs of action remain identical, and even the outside is not so very much altered. Old fashions re-appear. The Egyptians, too, had elegant cane-chairs, bathing appointments that would not disgrace the most elaborate modern mansion, parasols and fishing-rods, delicately carved chessmen and settees ; and ladies at their afternoon calls even then took dainty sips out of "fancy" cups, and, as we learn from their mural paintings, displayed their finger- and ear-rings with a satisfaction slightly tinged with envy.

We may see in the bodily structure, a mirror and copy of the life of the soul, that the human family has never really changed. The oldest skulls known to us, those of the "Stone Age," as it is styled, look like our own; indeed, the noblest of these, as gauged by dimension and facial angle, might be taken for those of any modern savants, while the inferior specimens resemble the present Papuans and bushmen.<sup>1</sup> The statues of Greece, moreover, exhibit a perfection and harmony of form no longer to be met with in ordinary cases; and the recorded feats of knights and squires betoken bodily strength and adroitness such as could compete advantageously with ours.

In the matter of civilization, it is a great mistake to compare the earlier circumstances of German, Gaul or Anglo-Saxon with their modern civilization. It would be quite as reasonable to set the palaces of Egypt side by side with the wretched tents of present-day Mongols or of negroes. At this moment there are plenty of savages in Africa, New Zealand, and Australia co-existent with modern culture. So from the first, the most dissimilar stages of refinement were not successive, but synchronous. For centuries before the Helvetii housed themselves in those lake-dwellings which survived in Europe till 750 or 1000 A.D., mighty civilizations were at their zenith in the palaces of Thebes, Memphis, Babylon, Nineveh, Tyre and Carthage, such as would find no cause to be abashed in presence of our own, and, indeed, far excelled ours in point of sumptuous munificence.

True, the ancient Germans, wrapped in their bear-skins, once dwelt in huts hardly superior to those of modern

<sup>1</sup> The facial angle of the Mentone skeleton is 85°, which is above the average. "Most of the skulls belonging to the Stone Period are above rather than below the average of the brain of the men now living in volume."—Prof. Pfaff: *Age and Origin of Man*. R.T.S. Present Day Tracts XIII. (E.K.S.)

natives of New Zealand ; but thousands of years before that the Egyptians possessed vast pyramids and temples, and gorgeous palaces, and had excavated the immense lake of Moeris and a Suez Canal.<sup>1</sup> Nebuchadnezzar had already formed the circumvallations of Babylon by the Euphrates, consisting of a square of ten leagues' circuit, the Tower of Belus rising in its centre to a height of six hundred feet, surmounted by a tall golden statue of the Sun-god, and girdled by twelve temples of various deities. The city was signalized also by its famous hanging gardens, watered by powerful hydraulic engines, and comprising a collection of all kinds of exotic trees and plants ; not to mention its ornate palaces, which lay bordering the river for three miles. This regal residence, with its extensive fields for the sustenance of the inhabitants in case of siege, covered an area more than twice as great as that included in the wide-reaching fortifications of Paris,<sup>2</sup> and was encircled by a wall four hundred feet high and one hundred feet broad, which the shots of the Persian besiegers could not reach over. Certainly a metropolis more methodically built and on a finer scale than the modern capitals of London, Berlin, Vienna, or Paris, stretching out, as they do, into hideous and featureless suburbs. When we hear the description of it given by Herodotus, whose narratives are more and more being accredited, we come to understand the boast of Nebuchadnezzar : " Is not this that great Babylon which I have builded for my royal dwelling by my great power and for the honour of my majesty ? " (Dan. iv. 30).

Doubtless those old Gauls once subsisted on acorns and horse-flesh ; but long prior to that King Ahasuerus, monarch over one hundred and twenty provinces from

<sup>1</sup> The Lake of Moeris is now ascribed, not to the fabulous king of that name (Her. ii. 101), but to Amenahmet III. (E. K. S.)

<sup>2</sup> Menant : *Ninive et Babylone*.



India to Ethiopia, gave a feast for a hundred and eighty days to all his princes and mighty men, and the like entertainment for the space of a week to the whole population of his capital city Susa ; at which were to be seen " white, green and azure hangings fastened with cords of byssus (or silk and purple) to silver rings and pillars of marble, and couches of gold and silver set on a pavement of alabaster, white marble and mother-of-pearl. They gave them to drink in golden vessels, and royal wine was mixed for them in royal measure. They drank also, or not, at their pleasure, according to the commandment of the king " (Esther i. 4-8). Such a feast may compare with the most illustrious court-balls or banquets of modern times, or, rather, it excels them as much in splendour and elaboration as the awe-inspiring palaces and temples of Sennacherib, Assur-banipal and Sargon explored at Nineveh and Khorsabad, with upwards of seventy halls, huge vestibules and avenues of winged bulls, surpass the barrack-like residences of modern sovereigns. The provision of such luxury, besides, presupposes a development of art and taste, as well as of industries and commercial intercourse within the confines of these great empires, equivalent to our own.

It is undeniable that ten centuries before our era, the shores of the Seine, where the proud metropolis of France now stands, were swampy, impassable forests, the haunt of the reindeer, bear and bison, and of a few savages armed with stone-axes. Yet the Chinese astronomer Chen-Kong had already in the previous century calculated the obliquity of the ecliptic as amounting to  $23^{\circ} 54' 2''$ . The present valuation of it is  $23^{\circ} 27' 22''$ .<sup>1</sup> Many hundred

<sup>1</sup> The obliquity of the ecliptic is at present equably diminishing at the rate of about  $48''$  per century, i.e.  $24'$  in 3,000 years. (E.K.S.)

years earlier even than that, we learn from the tablets of Sargon of Agade that there was a public library in existence at Nineveh, where scientific works, such e.g. as tables and observations concerning the planet Dilbat or Istar, our Venus, could be procured from the librarians in attendance, upon registering one's name and address.<sup>1</sup>

No doubt the English, now so prevalent, were still a barbarous nation at the time of Hengist and Horsa, traversing the sea in their *curraghs* or boats of wicker-work covered with horse-skins; but at a period antecedent by seven centuries haughty Tyre was already queen of the sea, and her merchants dwelt in palaces like princes, and dealt in vast sums like any present-day American Croesus. Their magnificently equipped galleys then traversed the seas, and fetched such quantities of silver out of Spain that they made their anchors of that metal; brought back tin from England, amber from the coast of Königsberg, and apes and peacocks from India; and circumnavigated the entire coast of Africa under Hanno, discovering the gorilla two thousand five hundred years before any specimen had been conveyed to Europe.<sup>2</sup>

These nations did not stand alone. The achievements of the Greeks in architecture and their decided superiority to us in sculpture are universally recognized: we still adorn our gardens and palaces with their statues. But the beauties of their pictorial and musical art have only become known of late. Amongst the excellently preserved portraits of the El-Fayum tombs, which are two thousand years old and painted with wax and certain pigments, there have been found, amongst some mere scrawls, several masterly pictures, especially that of an

<sup>1</sup> Flammarion: *Les Etoiles*, p. 759.

<sup>2</sup> Cf. Rawlinson's *History of Phœnicia*, Chap. IX., pp. 271-308; and, for a translation of Hanno's *Periplus*, *Ib.*, pp. 389-92. (E.K.S.)

old man with eyes as piercing and expressive as Lenbach ever painted.

At the performance in Stuttgart of the oldest extant Greek canticle, the hymn to Apollo discovered at Delphi, it was remarked by a connoisseur that the effect of the music "is profound and singular. Plaintive, sustained notes, recalling the *misereres* of the Roman Catholic service, fall on the ear, and still excite feelings of devotion by their solemn, ceremonial intonation. This hymn gives us a high impression of the artistic rank of the old Greek music, and we endorse the judgment of Reimann when he says that the full strength of the chorus, with orchestra of citharas and flutes, combined with the brilliant festal pageant of the shrine and the gilded lustre of the sanctuary itself, must have produced a remarkably sublime and majestic effect." Even Parisian critics were charmed, and declared the music "Wagnerian," but of a loftier and purer cast. It must be borne in mind that in such a portrait as that referred to, or in this anthem to Apollo, we by no means recover the highest achievements of the age in question. Think how many artistic abortions will one day be unearthed from the *débris* of the nineteenth century !

Every historical student is aware that whole volumes could be filled with a delineation of the complex civilizations of India and Egypt, Assyria and Persia, Phoenicia and Carthage, Greece and Rome, in descriptions of their pomp and power, ordinances of justice, architecture, horticulture, palaces, temples, theatres, baths, their swift galleys, iron-beaked like our men-of war, and their admirably marshalled and magnificently equipped phalanxes and legions, in rehearsing the treasures of Croesus, the magnificence of Nero, or the banquets of Lucullus. Entire books might be, and have been, written on their skill in the construction and setting up of massive bronze statues,



like that real wonder of the world, the colossus of Rhodes, whose ruins eight hundred and eighty years after its fall still weighed three hundred and sixty tons ; or in the fabrication of fine breastplates like that of Demetrius Poliorcetes, which was hardly scratched by the missiles of an engine discharged at sixty paces' distance.<sup>1</sup> Their achievements in ship-building are exemplified in the instance of the *Alexandria* of Hiero the Second (250 B.C.) which was as great as our first-class ironclads, or the considerably larger vessel of Ptolemaeus Philopator, manned by four thousand sailors, of which Vice-Admiral von Henk observes that " the ancients seem to have understood better than we do how to hold together such immense masses of wood." <sup>2</sup> The contriver of this gigantic ship succeeded, too, in beaching her for purposes of repair ; no slight undertaking either ! Much could be said of their dexterity in weaving a material so fine that an Egyptian lady was able to wrap herself in the same shawl which she could draw through the ring on her finger ; or of the manufacture of colours so excellent that they are brilliant as ever after four thousand years. Now, had they been painted with our aniline and alizarine pigments, they would have disappeared long ago, and we should have complacently inferred that these nations had never learnt the secret of compounding colours, or perhaps were colour-blind ! Nor were their workings in gold at all inferior. This fact is vouched for by the ornamentation of the Tabernacle, amongst other things, and by the jewellery of the Princesses Hathor-Sut and Sent-Senbet of the Twelfth Dynasty, lately brought to light

Plut. *Dem.* xix.

<sup>2</sup> Plut. *Dem.* xliii. But he adds that it was more for show than use, πρὸς ἐπίδειξιν, οὐ χρεῖαν. The verdict of Athenaeus (V. 203, 4)—εὐρυθμος ἦν καθ' ὑπερβολήν—is more favourable. (E.K.S.)

in the pyramid of Dokshur, which must be four thousand years old ; necklets of gold, amethysts and turquoises, bewitching golden shells. miniature pieces of furniture and breast-ornaments wrought in enamel (*émail cloisonné*) that are of unsurpassed beauty ; works of which one informant remarks that “ they can never again be equalled in point of perfection of handiwork or of their purity of taste, *even in our day, proud as it is of its technical resources.*” And so it was found that the execution of a certain Etruscan brooch representing three bees poised on a flower could not be copied successfully in Paris, in spite of repeated attempts. The same people, a thousand years B.C., were perfectly familiar with the art of setting artificial teeth by means of gold rivets, as we find from old skulls. That the ancients are still unsurpassed in graving on ivory is demonstrated by the splendid *gemma Augusta*, embracing twelve complete figures within the tiniest possible space, the *Achates Tiberianus* at Paris, and other surviving treasures. Thousands of years since, the breeding of fish, an art neglected in this country till recently, was in full swing in China and Egypt, where the artificial lake Moeris brought in a large revenue in fish-dues to the Pharaohs.<sup>1</sup> The same monarchs caused their enormous granite and porphyry blocks to be sawn through with the utmost precision by means of saws of diamond or sapphire three thousand years before we moderns hailed the use of diamond-borers at the St. Gothard Tunnel as a “ fresh scientific triumph.” And who is there that has not heard of the luxuriance of Solomon’s Court ?

To turn to the New World. When Cortes discovered Mexico, Bernal Diaz, one of his companions-in-arms, describes to us its wealth and luxuriance, the golden vessels of the Emperor, and his mantles embroidered with feathers of the humming-bird, each of them worth ten

<sup>1</sup> Her. iii. 91.

thousand gold ducats, the skill of his painters, the exquisite dishes prepared, and how the Spaniards stood speechless with wonder at the first view of the city of Mexico, with its temples and palaces lined with gold and silver plates, "albeit," he adds, "we had beheld in Spain, Seville and Granada, the pearl of the world."<sup>1</sup>

It requires therefore a large share of effrontery or ignorance to hold cheap mighty civilizations, which swayed the course of history for hundreds of years, solely because we travel by rail, despatch telegrams, and possess sewing-machines and photographic albums !

But where are these potent and affluent states to-day ? Where the queen of the sea, Tyre, once arose, a group of beggarly fisher-cabins now stands ; the site which the palaces of Nebuchadnezzar occupied is the lair of the lion and jackal, the haunt of Bedouin, buried in fever-haunted swamps amidst the reeds of the Euphrates. European tourists saunter amongst the ruins of Palmyra. Mesopotamia, Persia and the countries adjacent are for the most part a wilderness. Woe-begone *fellaheen* crouch in forlorn clay-huts throughout the land of the Pharaohs ; the cities of that metropolis and mart of Carthage that once glistened in peerless magnificence lie deserted and tenantless. Mexico has declined to a small third-rate town ; and tracts that were at one time the granaries of the world can at present hardly support a straggling population. Even in civilized Italy the very *maremme*<sup>2</sup> which are abandoned on account of their malarial reputation cover ground where the Etruscan people, those great builders and incomparable goldsmiths, once inhabited populous cities. What would the haughty merchants of Phoenicia, or the princes of Carthage, Nebuchadnezzar, Cyrus or Alexander the Great

<sup>1</sup> See Keatinge's translation of Diaz's *True History of the Conquest of Mexico*, London, 1800.

<sup>2</sup> Ital. "fens."



think of the "progress of humanity," could they come back and see the present desolation of their once fertile provinces ?

The Germans, English, French, and perhaps the Russians, at that time unknown barbarians, have indeed grown into civilized nations in the interim ; but then four hundred and fifty millions of Chinese, one hundred and eighty millions of Hindoos, and more than fifty million Africans, with Tartars and Arabs, that is to say, half the human family, have remained perfectly stationary. Can it be that the intellectual sum-total that God has presented to His creatures for their voluntary utilization, is as constant a quantity as the two hundred and seventeen thousand milliards of horse-power which is the sum of force that the sun disburses generally over the earth *per annum*, and which we are also free either to employ for the ends of commerce or the illumination of our cities, or to allow to lie fallow, without any consequent increase or diminution in its amount ?

The ancients were our equals in the excogitation of sources of bodily pleasure, and in the sagacity with which they turned to purposes often very different from ours, the forces of nature and matter in their days. It would be most illogical because they did not discover telephones or dynamos—things for which they were not looking—to infer that they were intellectually our inferiors. Solon, Plato or Pythagoras, Pindar or Sappho, might appear in modern dress in the finest saloons of Berlin or Paris without exciting surprise ; on the contrary, they would behave with just as correct etiquette as we do, and, after a short acclimatization, would charm us as much as ever by their "brilliant remarks," their "witty and interesting conversation" on art or politics or poetry, and fascinate us no less than their contemporaries by their "winged words." Aristotle would easily familiarize himself with the field of modern

science, and Hannibal (regarded by Napoleon, no mean judge, as the first general of all time) with modern tactics ; Archimedes would soon comprehend our steam-engines and other inventions ; and they would then stand out as conspicuous in genius as ever. Did the worthies whose lives Plutarch narrates fall short of us in loftiness of thought, in spirit and genius, in resolution and fortitude, in short, in any human virtue, or in intellectual vigour ? In this light the great historian von Ranke regards the nations as so many great families, which grow up, bloom and then decay, without transmitting their idiosyncrasies to others. At least, hardly any one will venture to contend that we have inherited *all* the virtues of Indians and Egyptians in conjunction with the Greek sense of beauty and the iron will of Rome. Professor Holzer speaks even more emphatically : " To talk of the ' ends of humanity ' in general is meaningless ; the commonplace of ' progress ' is likewise merely specious verbiage ; for the subjugation of refined civilizations under a barbarism physically more robust is undoubtedly the rule in history." <sup>1</sup>

It is not the accumulation of facts or conclusions from them, the inventions and discoveries that we have amassed for centuries so laboriously and the burden of which well nigh crushes us, that determines the mental outlook or stature, but the strength of mind with which a man utilizes what is within his cognizance, whether that be much or little. Sir Isaac Newton could derive more intellectual capital from the fall of an apple than many educated people to-day extract out of their entire natural philosophy. But this force of mind has not been augmenting ; whilst a gross ignorance of the history of nations and of human thought, of moral and natural laws, is a chief characteristic of what we term " the fashionable world." To mention

<sup>1</sup> Festrede, Ulm : Feb. 25, 1897. Cf. also Huxley : *Revue des deux Mondes*, Oct. 1896.

but one indication which is conclusive to any one who looks below the surface of things ; that unerring standard of the higher education and collective status of a people, language,<sup>1</sup> evinces no improvement. On the contrary, Schopenhauer is of opinion that the slow declension of languages, which, as we may see in the case of Sanskrit, are the more perfect the older their date, is a signal argument in contravention of the favourite theory of the " constant advance of humanity." <sup>2</sup> We have no better poetical dialect than that of Homer or Sakuntala,<sup>3</sup> none more philosophical than that of the *Phaedo*, or more dramatic than that of *Oedipus Coloneus*, or more laconic or pointed than the Spartan style, not to urge the fact that we cannot write books like the Psalms of David or Job. The intellectual greatness of the ancients is best reflected in the circumstance that even nowadays we reckon as " liberally educated " those only who have spent the best years of their youth in the study of Greek and Latin literature, history and philosophy. How does that accord with the conceit that we are intellectually far superior to the ancients ? Indeed, eminent authorities acknowledge that we have come no nearer to the solution of the great problems of existence, and are quite as much confounded by the primal enigmas of the universe, as the old philosophers and thinkers were. The well-known astronomer Proctor concludes his book, *Our Place among Infinities*, in these terms:—

" I would ask in conclusion whether we have now better reason than the astronomers had of old time to consider the mysteries of the universe as fully revealed to us and interpreted. We know much that was unknown until of late, and we have been able to understand some matters which once seemed inexplicable ; but the star-depths as we see them

<sup>1</sup> " Languages are the best mirror of the human mind."—Leibnitz. (E.K.S.)

<sup>2</sup> *Par. und Paral.* Sect. 307.

<sup>3</sup> Sakuntala is the heroine of a Sanskrit drama by Kalidasa.



now are even more mysterious, as well as far more wonderful, than as displayed to the astronomers of old " (p. 233).

Dubois-Reymond affirms that we are as much non-plussed by the problem what matter is as the old Ionic physiologists. " Our species seems, in one sense, to have been stationary since Homer's day. The essence of the physical world has not become more intelligible to us since the time of Epicurus, who recognized the perpetuity and potency of matter, nor the mental since Plato and Aristotle." Elsewhere he adds, " neither in the comprehension of force and matter, nor in educing mental phenomena from material conditions has the human race made any true advance for two thousand years, in spite of all the discoveries of science. Nor will it ever do so ! " <sup>1</sup>

But we might have waived the whole discussion, and merely thrown out the query whether mankind is *happier* than in former ages. Augmentation of happiness is genuine progress. However divergent the opinions and desires of men, in this point all are alike ; all seek to be happy either in the pursuit of art or science, fame or power, wealth or voluntary poverty. Now the response to this question must be couched in the negative. Reputed progress has not brought with it satisfaction. It is not only the masses of men who tell us this, not only those who, aggrieved at their lot, would fain subvert the existing social order, and construct a new fabric out of the ruins, but those also who represent the reflection of the race. All our modern philosophy is pessimistic. It is Kant who styles life a " time of probation to which the majority succumb, and in which even the worthiest has no joy in his being " ; <sup>2</sup> and Schelling who talks of the " profound and ineradicable pathos of existence," and subjoins : " in fact, it is a path of

<sup>1</sup> *Über die Grenzen des Naturerkennens.*

<sup>2</sup> *Werke VII.* 393.

sorrow that every individual treads, a fact to which that shadow of pain which rests on the face of nature and the animal creation bears record.”<sup>1</sup> “Fools,” says Schopenhauer, “treat the world as an ultimate reality, and regard the paltry happiness of this life as its aim, although, even when most favoured by circumstances, it is a false, illusive, disappointing, dreary thing, out of which neither constitutions nor legislation, nor steam engines or telegraphs can ever elicit anything intrinsically better.”<sup>2</sup> Von Hartmann anticipates the regeneration of the world from “the ultimate penetration of the human consciousness with the conviction of the folly of volition and the misery of existence, so that it shall conceive so deep a longing for peace and the insensibility of annihilation that that longing shall irresistibly be realized.”<sup>3</sup> Suicide, then, is the goal of existence ! Can that be progress which drives philosophy and its seers to such an outcry of despair ? These men reiterate what Solomon said long ago, that “there is nothing new under the sun ; all is vanity.”

And how sombre and sardonic is the tone of our modern fiction and drama, with its false glamour, not of happiness, but of mere physical enjoyment, succeeded by inevitable disenchantment, the sole prescription for which is self-destruction ! Away with “progress” of this stamp !

But it is the heralds of advance among natural scientists who display the most glaring contradictions of all. On the one hand they predict the final triumph of science and enlightenment, on the other they announce that the globe, the solar system, nay, the universe is advancing towards the catastrophe of torpefaction ; and that for thousands of years before this event a frozen humanity will collect more and more round the tropics, and at last find its engrossing

<sup>1</sup> Werke. I. 266.    <sup>2</sup> *Die Welt als Wille*, II., Chap. 38.

<sup>3</sup> *Phil. des Unbewusst.*, p. 751.

occupation in efforts to prolong its hapless existence. The Darwinist Clemenceau, as we shall presently see, prognosticates for the human race, in terms of the evolutionary scheme, a culmination of "unspeakable misery." Spiller too informs us that it "is virtually beyond question that the last members of the race will live as equatorial Esquimos."<sup>1</sup> A matchless style of progress, in good sooth, and truly sublime culmination to enlightenment and science! Again we repeat, what contradictions these are!

The agreement of all religious systems in predicting no progressive amelioration of mankind is remarkable. All of them not only assure us that man has fallen from a state of original blessedness, but that, by successive stages, he grows worse and worse. The Greek and Roman mythologies have their golden, silver, copper and bronze *saecula*. It is so in India. A progressive degeneration of the world from its commencement to the present day was inculcated by Manu in the form of the same four ages, of which the present, dating from the Flood, is called *Kali-yuga*, the "age of strife." The Bible likewise depicts to us the course of history in Nebuchadnezzar's vision by the image with golden head, silver breast, brazen body, and clay feet. However men may make themselves more and more at home in this world, their moral declension is plainly denounced to them.

On the whole, as far as mere civilization goes, we may gather from history that the sum-total of intelligence has always been a nearly constant quantity at one time, though the nations that have stood foremost in succession have expended that energy successively on pleasure or power; one in pursuit rather of art and beauty, another in the extension of industry and commerce. There have ever been great civilizations; but the entire human race has never been civilized.

<sup>1</sup> *Die Entstehung der Welt*, p. 503.



## III.—PRE-HISTORIC MAN

But what about the pre-historic men of the "Stone" and "Bronze" Ages? The truth is, scientists are beginning to treat this subject with more sobriety. Those incalculable ages during which palæolithic generations "never hit upon the device of supplying flint-stones with a handle to turn them into hatchets" are a very pretty freak of imagination on the part of certain wise heads. But they contravene, in the first place, all canons of proportion in human development.<sup>1</sup> When we ponder the fact that the historical period in Europe amounts at the utmost to three millenniums, and that in this brief interval we are carried back almost demonstrably to the "Bronze," if not the "Stone" Age, it is obvious how utterly unlikely it is that man should have continued stationary for fifty thousand (some even say three hundred thousand) years or more. Such aboriginal human beings as are here imagined must have been far less susceptible of improvement than the dog or the rose-tree; in other words, creatures essentially different from the modern species. The race would then resemble a child that suddenly started to run and talk, after remaining in a condition of stolid immobility for fifty years. But these assumptions are indefensible on other grounds. We have come to perceive that many of the conditions which we have been wont to reckon successive in reality *synchronize*.<sup>2</sup> Even at the present day all conceivable gradations of savagery exist

<sup>1</sup> "The higher any object stands in the scale of creation, the greater is its activity in a given period. The crystal develops in millenniums, the tree in centuries, man by decades. It is perfectly natural that the earth should traverse cosmic epochs, whilst mankind exists for a much briefer, and, as it were, condensed interval of time." Bettex: *Das Lied der Schöpfung*, p. 274.

<sup>2</sup> So Poyd Dawkins concludes: *Present Phase of Prehistoric Archaeology*, p. 4.

simultaneously on our globe, in some cases among tribes once exhibiting a higher status. The historian of materialism, Albert Lange, himself says impartially: "At present a strong revulsion of opinion has set in against these cycles mounting up to hundreds of thousands of years. In fact, the supposition of intervals of millennial duration appropriated respectively to the mammoth, the primitive bear and the reindeer, seems untenable. All these animals subsisted at the same time, and the condition of their bones affords no indication of their age. When Professor Fraas descends to periods comprized within the six thousand years of Biblical chronology, no valid objections against his view can be suggested." Similarly Dr. Ranke, in his *History of Man*, declares that "the proof of man's existence in the Tertiary era has not yet been found,"<sup>1</sup> and elsewhere, "the oldest vestiges of humanity do not ascend above the Flood." Indeed, he says in one place that "in his earliest epochs, namely, the uppermost and most recent diluvial strata, traces of man have not been met with hitherto." Boyd Dawkins, indeed, questions "diluvial man" altogether, and points out that in many instances the so-called "troglodytes" were not contemporary with the animals whose bones have been found in these caves. Even at this day there are hundreds who eke out a miserable existence as cave-dwellers not only in Central Africa, but along the banks of the Loire!<sup>2</sup> As for the flints, M. Robert regarded the

<sup>1</sup> "The presence of man on the earth during the Tertiary era is not confirmed by facts." Dr. G. Beck: *Der Urmensch*, p. 35. Lange: *Gesch. des Mater.* II. 317.

<sup>2</sup> There are "troglodytes" at the present time even in England! An account of the best specimen of tenanted cave-dwellings in this country, at Kinver Edge, near Kidderminster, may be found in *The Leisure Hour* for Sept., 1902. (E.K.S.)

fragments at Grand Pressigny (the chief memorial of the "Stone Age" in France) as the relics of a manufactory of flint-lock muskets of the last century; and the celebrated geologist, De Beaumont, shared his opinion! Granting that this view is scarcely correct, at any rate the instance evinces clearly enough with how little precision the age of these stone implements can be determined, and how purely hypothetical the favourite "millennial" systems are.<sup>1</sup> Whereas Morlot, in 1868, assigned 8000 years for the combined Bronze and Stone Ages, the well-known archæologist Troyon, in his researches regarding the Stone Age, takes us back no further than 1500 B.C. Moreover, Professor Fraas dates these settlements of Germanic tribes on the lakes at 800-600 B.C., and remarks: "Nothing whatsoever compels us to place the first erection of these lake-dwellings prior to 1000 B.C." If so, they are coeval with Solomon's temple, and centuries posterior to the zenith of Egyptian culture! Other authorities bring the survival of these Swiss buildings down to as low a date as Charlemagne. It is certainly a fact that the Stone Age (and probably that of the reindeer) lasted in some districts of Gaul till Cæsar's day. The Maoris had retained it in New Zealand up to the present century. Moreover, the peasants of the southern Tyrol still use exactly such flint-knives, purchasable at Bozen, for striking lights, as the men of the Stone era had, and the fishermen of Lake Zurich the same stone-rings as the lake-dwellers in the time of Christ; only, as Troyon informed the author, of *far less finished*

<sup>1</sup> As an instance of this, it may be noticed that "at Hisarlik, the accredited site of Troy [and at Tiryns], no iron is to be found in the oldest strata, which may be regarded as dating from the time of the Judges."—Bettex: *Das Lied der Schöpfung*. Cf. Hes. *Op. et D.* 150. μέλας δ' οὐκ ἔσκε σίδηρος. Max Müller assures us on philological grounds that "Greek was spoken before the discovery of iron." (E.K.S.)

*workmanship*. (Another proof, by the bye, that defective products or implements are not invariably the most ancient). The archæologists of 3000 A.D. will, no doubt, draw strange inferences from hence respecting our unfortunate era! How many centuries will they not confidently intercalate between these yokels and fishermen and the "highly cultured" patients at Meran or the plutocrats of Zurich!

One word must be added concerning the worthlessness of conclusions drawn from single skulls.<sup>1</sup> Professor Vogt considers the famous Engis skull which was discovered in 1831 as decisively simian; but Lyell treats it as that of a Caucasian, and Professor Huxley, on the other hand, himself a Darwinist, regards it as so symmetrical that it "might have belonged to a philosopher"; whilst the St. Petersburg anatomist, Landzert, institutes a comparison between it and the classical crania of the Greeks! Virchow, speaking of the equally celebrated Neanderthal skull, which some have attempted to view as the type of simian, antediluvian man, says that "even if it were set up as the typical skull of the race, a contention quite inadmissible in his judgment, no kind of approximation to the skull of any variety of ape could be deduced from it." Dr. Pruner-Bey, who took a cast of it, found its content greater than that of the average modern cranium, and believes it to be the skull of an historical Celt. But Professor Davis thinks that it is the brain of an idiot who, in all probability, met with an accident comparatively recently amongst the precipitous cliffs where it was found! Professor Fraas, himself an adept in these matters, justly

<sup>1</sup> Illustrations of the wide differences between the human skull and that of the ape will be found in Figuier's *Primitive Man* (pp. 25-7), Eng. trans. Cf. also p. 115, Boyd Dawkins' *Cave-Hunting*, p. 241 sq., and Quatrefages' *Rapport sur le Progrès de l'Anthropologie*. (E.K.S.)



ridicules such conjectural results, and adds: "These learned speculations furnish the best evidence that we know as good as nothing of these oldest settlers." Skulls do not carry dates on them any more than other bones, or stone-axes, and there were in every generation both round and long specimens, clever heads and numbskulls, and malformations and lunatics to boot! "It may be legitimately maintained," says Pruner-Bey, "that there is no single cerebral formation of which examples are not forthcoming in the caves of Solutr  ."

In like manner all attempts to allot distinct properties to dolicocephalic or circular varieties, and to erect racial theories on this footing have been shown to be ungrounded, both in particular cases and in national history. We would refer the reader on this head to Fouill  e's *La Psychologie des Peuples*.<sup>1</sup> In fact, two German anthropologists, Ammon and Poschinger, have actually had a dispute of late whether Bismarck was "dolicocephalic" or "brachycephalic"! In this department, too, spirit controls and domineers over matter, in defiance of our hypotheses, and constantly originates startling exceptions. Even the Corsican Buonaparte had blue eyes! Finally, Professor Fraas has conclusively evinced, in the case of the alluvial mud of the Nile, the hazardousness of conclusions derived from calculations of the rate of deposition of detritus, etc.

It is by no means requisite to predicate an era of human existence more remote than that implied in the Biblical chronology, because Figuier and others consider that the

<sup>1</sup> Cf. Prichard, *Natural History of Man*, p. 473: "All the diversities which exist are variable and pass into each other by insensible gradations," and Haeckel's admission: "Within the limits of a single race the shape of the cranium can vary even to the most extreme forms." See Urquhart's *New Biblical Guide*, vol. I., pp. 399-403, whence these quotations are taken;—an apologetic of great value. (E.K.S.)

first men were contemporaries of the cave-bear and the mammoth, bones of which, and also a good likeness sketched on ivory, were found in the cave of Bruniquel (Tarn-et-Garonne).<sup>1</sup> It is much more highly probable, for nothing can be alleged against the supposition, that the mammoths whose carcasses are preserved, with portions of their hair and skin, and the blood still congealed in the arteries, in the ice of the *tundras* of the Taimur, the Lena and the Petchora (with whose flesh the Tungusians and Yakuts still occasionally feed their sledge-hounds, and the ivory of which is an article of export to London) are contemporaries of the Biblical Deluge; indeed may have perished in that very deluge.<sup>2</sup> In that event mankind would have lived, according to Scripture, for 1500 years in company with the mammoth, and in all likelihood with the primitive bear and lion as well—a period more than sufficient for a “Stone and Bronze Age” coextensive with the globe.

The contention that these primitive men bore any resemblance to monkeys is now overwhelmingly refuted. Figuiet, writing of the Mentone skeleton, which is supposed

<sup>1</sup> Drawings on ivory of the reindeer and of fishes have also been found. These are now supplemented by the remarkable mural paintings discovered at Altamira, and, more recently, notably in 1901, in the Dordogne, including representations of the wild-horse and of the same animal apparently saddled. The pictures were drawn with stone tools, the grooves being filled up with ochre, etc., and display an intelligence and observation not inferior to that of the average modern man, who would certainly not draw better with the same tools. Specimens of the best of these sketches are reproduced in *Comptes Rendus de l'Académie*, Dec. 9, 1901. “The dream of simian man,” says Dr. Dennert, “is thus once more relegated to a remote past of which we know nothing, and where full rein can be given to imagination. But that is not science.” (E.K.S.)

<sup>2</sup> See Sir H. Howorth's *The Mammoth and the Flood* (1893).

to be the oldest relic of the kind, says that "one is surprised at its likeness to the finest modern crania. The facial angle does not appear to differ from the type of the most intelligent races of mankind. Where, we may ask, does the alleged descent from the ape find a place here?" These antediluvians were much rather imperious natures, full of untamed, self-reliant strength, as they are pictured to us in the song of Lamech and the fifth chapter of Genesis, and as these muscular skeletons and fine skulls testify. Broca remarks that the Cromagnon skulls exhibit in conjunction an almost bestial greed and force in the lower half, together with a forehead and brain of the most spacious order and the most superior formation. These are those old long-lived giants who figure in all mythologies, battling against lions and monsters or amongst themselves, nay, menacing the gods and seeking to scale Olympus, in the character of Titans, demi-gods, etc.—Hercules, Theseus, Odin, Thor and the rest—and like Cain's grandson, Tubalcain, that "master in all works of smithery" whose name has lingered in the Roman Vulcan, were themselves venerated as deities.

This Titanic clan very soon learnt, as the Scriptures tell us, to build cities and fuse all kinds of metals, and invented musical instruments; whilst the minor races meantime, the Pariahs of humanity, fled timidly before them to remote districts and caves, and for a long space lived in barbarism. Surely the couple of hundred tenants of the caverns of Cromagnon, Aurignac and Solutré, do not represent the whole then existing population of France, but only some *exceptional cases*; for Professor Fraas is of opinion that these hunters in other instances interred their dead with due solicitude. But the mighty men, held in religious reverence in the East, and at a later date in Rome, under the titles of Kebirim, Cabiri,<sup>1</sup> "the great"

<sup>1</sup> Cf. Her. iii. 37, Job xv. 10 (Heb.).

or "the strong," who were able to build Cyclopean cities, an ark of larger tonnage than our ironclads, and the Tower of Babel subsequently to the Flood, could have erected temples and pyramids in Egypt forthwith, and did not require the lapse of centuries, or even "countless millenniums," to acquire the rudiments of civilization.<sup>1</sup> For mankind have never lacked an intellectual pontiff, or gifted and predominant nations to be their vanguard.

There is as little ground for the anticipation of the entire future civilization of the race. During the last fifty years we have been repeatedly disabused of the hallucination that savage tribes can be incontinently promoted to the rank of civilized by the importation amongst them of brand-new laws and regulations, with (duly taxed) European clothes, customs and schools; for it has been found that some of them, strangely enough, prefer to become extinct! On the other hand, Anarchists, Nihilists, Communists, the hundreds of thousands of homeless vagabonds in our midst, and the tens of thousands who live in London, Berlin, Vienna, Paris and New York in conditions worse than those of savage races, the human rats of our great cities who support themselves on garbage and petty lar-

<sup>1</sup> The current exaggerated estimates of Egyptian chronology rest on mere conjectures, justly rallied by Oppert; and the earliest astronomical test applied (by Dr. Borckhardt) reduces the 12th Dynasty to 1875 B.C. Sir Robert Anderson has shrewdly remarked that, if we had had any imagination, we should have elaborated our Saxon Heptarchy into seven successive royal families. Nor does Babylonia offer the requisite counterpart to these inflated figures. The sceptical Winckler has now brought Sargon of Agade down as low as 2750 B.C., and admits that this king stands at the very inception of historical Accadian tradition. It is also remarkable that the Deluge is a dividing line not only in Berosus, but also in the inscriptions, which employ the very phrase, "the days before the Flood." (E.K.S.)



ceny, compose a mournful commentary on the civilizing influences of the age. Finally, that social upheaval of the future, compared with which it is predicted that the French Revolution will rank as a mere piece of child's play, cannot but have a disastrous effect on modern "culture!"

In the human structure the head, the seat of thought, occupies barely a tenth part of the body. In like manner it would seem that the function of mental guidance is assigned to an even smaller segment of mankind,<sup>1</sup> and that any interference with this constitution of things may be as pernicious to it as if the brain were enlarged at the expense of the remaining organs of the body. Probably it will always be so; but the complaints of the subordinate members of the human family at the injustice of this arrangement are as perverse as if one's foot or arm were to bewail the misfortune that it was not the brain or eye. Happiness does not lie in (so-called) education or civilization, but in the fear of God and moral rectitude. We may make that discovery by comparing the inhabitants of many a tranquil vale of Switzerland, the Tyrol, Scotland or Norway with the men of fashion, or business and money-making classes, of London or Paris. A plain stone-mason may be as happy as Michael Angelo; indeed, has a much greater chance of being so. It was a shrewd remark of Bismarck that he had known many contented foresters, but not a single contented minister or politician in his life. As for eternal blessedness, it is notorious that that does not hinge on earthly rank or education, and is promised rather to the poor than to the rich and influential of this world.

<sup>1</sup> "For just experience tells, in every soil,  
That those who think must govern those that toil;  
And all that freedom's highest aims can reach  
Is but to lay proportioned loads on each."

Goldsmith : *The Traveller*.

(E.K.S.)

## IV.—CHRISTIANITY AND PROGRESS

IN regard to this question, many date an era of progress from the first advent of Christianity, and assign to it a potent civilizing function. We dissent from this belief. Had it been the purpose of our Lord to civilize mankind, how easy would it have been for Him to have appeared as the son of a Roman Emperor (He might nevertheless have died on the cross), to introduce, as universal Ruler, a new era of Christian refinement and intellectual advance by unexceptionable ordinances, statutes genuinely humane, and a gradual abolition of the scandal of slavery, by an enlightened patronage of art and science, and by promoting commerce and manufacture ! How might a few words from Him have guided us to a correct knowledge of steam, electricity and other material forces of which we are still ignorant ! He might have solved all social problems and put an end to physical suffering by a perfect regimen supplemented by miraculous agency, by a supernatural augmentation of the means of sustenance, and so on.

Such a procedure lay wholly at His divine disposal, inasmuch as God controls history, and is no "product" of it, as certain wise men have pretended to discover. But there is not a surmise of all this ! We might almost say that Christ scorns—He certainly ignores—art and science, politics and legislation, and refuses to intervene even in a plain question of right with the stern rebuke, "Man, who made Me a judge over you ?" Brought into the presence of the representative of the mightiest empire of the earth, instead of expounding to him the incalculable advantages of Christian civilization, He rebuffs him with the short answer : "My kingdom is not of this world."

"What doth it profit a man if he gain the whole world and lose his own soul ?" Let a man be converted, and he is civilized enough ; but, unconverted, neither education

nor civilization will do him any good.<sup>1</sup> That is the language of Christ. He did not come to bring culture, but eternal life to our race; and the boon was rejected. A reflecting mind will see, on the contrary, that a state composed of true Christians would not have developed art, or commerce, or industry to half the extent that they have grown. Satisfied with a moderate competence, and eyeing eternal interests as first and earthly things as secondary in rank, such a polity would have set no great store on inventions like electric lighting, telegraphs, telephones and railroads, as we may gather from the annals of the Moravian Brethren, the Puritans, and other Christian communities. Christianity sanctions the pursuit of trade and commerce, science and art, but it forbids the Christian to make his art or science or any earthly vocation his main business. His watchword also is that utterance, "My kingdom is not of this world."

Those persons who, whilst in many cases rejecting the divinity of our Lord, take pains to prove that modern civilization, art and science are an outcome of Christianity pay her a very dubious compliment; for then, on *a priori* grounds, Christian art and science, modern culture, and our reputedly Christian governments, ought to surpass all previous institutions of the kind as far as the truth of Christianity towers above the infatuations of paganism. Every one must perceive that such is not the case. No Christian churches, not even St. Peter's or Cologne Cathedral, stand out as preeminently above the Parthenon, the Ephesian Temple of Diana, or that at Karnak, or the gorgeous shrines of India, as Christianity does above heathen systems of religion. As works of art, the Madonnas of Raphael and Murillo are not superior to the Venus de' Medici or the Apollo Belvedere; nor does Michael Angelo's Moses excel

<sup>1</sup> "Upright creatures may want to be improved: depraved creatures want to be renewed."—Butler's *Analogy*, I. 5.

the Zeus of Phidias in sublimity. As for Protestant art, as we might anticipate from its slight recognition of symbolism, in mere conception and execution, its stained glass, carved pulpits and "altar-cloths," and its sometimes pretty, but bare places of worship, are so obviously inferior to Romish productions, that, judging by such a standard, we should be compelled to associate it with a much smaller modicum of Christian feeling and truth. But the completion of the minsters of Cologne and Ulm has been stripped of all *sacred* associations by the circumstance that it was only effected with the assistance of lotteries !

No doubt, art and nature have a divine fountain, and all the laws of the former are implicitly embodied in the latter. But that which is divine is not therefore Christian. The universe, a revelation of God accessible to all mankind, is divine : the peculiar revelation of God in Christ, applied to the individual soul by the Holy Spirit alone, is Christian. As there is no such thing as a Christian external nature, there can be no Christian, but only an ecclesiastical (Greek, Anglican, or other) art, appropriated to the service of the Church. "As education progresses," says Herder, "there arrives an epoch in the history of every nation when its art supersedes itself." Baader writes still more drastically : "There is no Christian art, save that of bearing the cross. Of what use to paint madonnas, angels and saints in this region of darkness and gravitation, figuring a hyper-physical world in mundane colours ? I feel a contempt for that entire school." Not without reason does the realistic painter Courbet aver that "no artist should paint an angel or a portrait of Christ ; for he has never seen either."

It is a most significant fact, and by no means casual, but the act of Providence, that whilst we possess excellent likenesses, and in many cases even well-preserved, authentic mummies of the Pharaohs and rulers of Nineveh and Baby-



lon, we have not one effigy or representation of a single prophet or apostle, or of the Saviour Himself.<sup>1</sup> Any attempt, therefore, to illustrate the Scriptures is open to grave objection. An outward, realistic representation, supposing such a thing possible, would inevitably daze the mind, arresting its attention upon accessories, and diverting it from the deep significance of the written word. On the other hand, an idealized picture, governed by conventions of style, is untrue at the outset. God has His own reasons for not giving us a "pictorial Bible." He could easily have inspired one or more Bezaleels for such a task. But a spirit of emancipation from externalisms and the thralldom of material forms pervades the whole of Scripture from that commandment, "Thou shalt not make to thyself the likeness of anything that is in the earth beneath," and the prophecy, "He hath no form nor comeliness that we should desire Him," down to the declaration of our Lord that "God is a Spirit, and they that worship Him must worship Him in spirit and in truth," or the utterance of Paul, "Though we have known Christ after the flesh, yet now

<sup>1</sup> "Whereas human nature has ever been prone to the superstition of local consecrations and personal idolatries by means of memorial relics, apparently it is the usage of God to hallow such remembrances by removing, abolishing and confounding all traces of their punctual identities. That raises them to shadowy powers, into the state of great ideas, mysterious as spirituality is mysterious and permanent as truth is permanent. Therefore it is that Paradise has vanished ; Luz is gone ; Jacob's ladder is found only as an apparition in the clouds : the true cross survives no more among the Roman Catholics than the true ark is mouldering on Ararat ; no scholar can lay his hand upon Gethsemane ; and for the grave of Moses the son of Amram, mightiest of lawgivers, though it is somewhere near Mount Nebo and in a valley of Moab, yet eye has not been suffered to behold it, and "no man knoweth of his sepulchre unto this day."—De Quincey : *Works*, Vol. XI. 10, 11.

henceforth know we Him thus no more." Whither, moreover, the natural craving and reverence of man for the outward form tends, the image-worship of the Romish and Greek churches, and in a grosser and more barbarous shape fetishism and idolatry in general, are witnesses.

As for the ethical standard and humanitarianism of a nominal Christendom, the moral conditions of the Byzantine court were undoubtedly worse than those of Egypt, Greece or Republican Rome had often been, worse than they had been under Titus, Adrian, Trajan or Marcus Aurelius. They became yet more degraded in the so-called Christian Rome of the Borgias.<sup>1</sup> The entire spirit of the Middle Ages—aptly designated "Dark"—the fruit of an erroneous conception of Christianity embodied in the Inquisition, witch-trials and, finally, the Thirty Years' War (three of the most ghastly spectacles in history), was an immense retrogression from the civilization of Egypt, Greece and Rome. Goethe, Schiller, and others are not altogether in the wrong, when they deplore that what they falsely deemed Christianity had not proved itself capable of engendering such attractive and harmonious social conditions as classical antiquity had produced.

It is ridiculous to fancy that religion can ameliorate a country that retains but its name. Faith blesses here and hereafter him, and him only, who believes ; not, as it were

<sup>1</sup> If any one doubts this let him read the awful facts avouched for by various witnesses : how at Cardinal Estouteville's burial the rings were torn off the dead man's fingers by the monks ; how upon the murder of the Duke of Gandia, the incestuous Pope (Alex. VI.)'s son, a witness said he had seen a hundred bodies thrown into the Tiber, and no one blamed for it ; how *every* office in the church was sold to the highest bidder ; how nameless orgies defiled the Vatican, and this Pope was probably poisoned by a potion he designed for a cardinal :—and doubt no longer. (E.K.S.)

by some contagious influence, his neighbour who loathes and spurns, or makes it his butt. He reaps only—and this truth applies likewise to nations—"greater condemnation." It would be a venomous calumny to hold up for our homage as a genuine outcome of the teaching of Christ the present-day civilization of the professedly Christian nations of Europe from Gibraltar across to Archangel, invertebrate as it is, and impotent to cope with the advancing tide of Socialism and lawlessness, flouted by Stock-Exchange swindling and the tricks of company-promoters, by the appalling condition of its metropolitan cities, by its non-Christian and frequently atheistic and communistic representatives, by an anti-theistic science and anti-Christian literature and a sensuous and immoral art; in short, by a barefaced or dissembled aversion from God and hatred of His name! It is of this bastard Christianity, for he knew no other, that Strauss asserts that "it prolongs its existence among cultured modern nations only by virtue of amendments it receives from a secular intelligence and culture which is magnanimous, weak, or astute enough to ascribe these not to itself, but to that religion to which it is in reality inimical."<sup>1</sup>

But Christ sent His disciples forth as "sheep among wolves," sent them forth as a light to lighten the darkness and malignity of the world, as a salt to avert putrefaction; and that is what they have been for these eighteen hundred years. Who will deny that incidentally they have exerted a salutary, ennobling influence on their surroundings? Yet it is none the less true that their mission has never consisted in civilizing mankind, and whenever they have fancied that it did, both as individuals and collective churches they have invariably found the divine fountain of their vitality forthwith checked in its flow.

<sup>1</sup> *Alter und Neuer Glaube.*

Christ, at His departure, would have rejoiced assuredly to have comforted His apostles with the promise that they should vanquish the world by the power of His word, and inaugurate a Christian era for all nations. Far from that, however, He predicts to them till the end hatred, tribulation and persecution, and inquires "Suppose ye, when the Son of man cometh, He shall find faith on the earth?" a question which He elsewhere answers in the negative. "As in the days before the flood, they were eating and drinking, marrying and giving in marriage, until the day that Noah entered into the ark, and knew not until the flood came and took them all away: so shall also the coming of the Son of Man be." This broad juxtaposition of the future terminus of history with the perdition of an unrepentant earlier world, filled with violence and crime, is His repudiation of the favourite dream of Christian progress. What meaning would the terrible, annihilating judgments upon the human race and upon nature at the close of all things, which Christ pictures in Matthew xxiv. and Luke xxi., and of which Revelations is full, bear, if the world is to advance uninterruptedly in Christianization and civilization? That world is not, that world never will be, the Bride of the Lamb.

Thus Scripture presents us with a visible history of mankind, sinking from one depth to another; and, by its side, with a divine, invisible history, leading us upward in more and more sharply defined types from the pious antediluvians to the people of God, and from thence to the congregation of Christ.

But it will be said that this is a morose conviction. What! Is the human race, like a horse in a mill, eternally to revolve in a circle without moving from its station, and to exhaust itself in ineffectual strivings after a satisfaction never attainable? We answer, first of all, by asking who is to blame for this? Most certainly, God is not. Is it



any part of His commandment that mankind should perpetually lacerate its own flesh in sanguinary wars, or expend thousands of millions annually in Europe alone for this purpose ; drilling millions of stalwart young men day after day in the art of slaughtering their fellow-men with the utmost dispatch ? Is it His will that human beings should blunt their sensibilities to all that is great or true or noble in the pursuit of deteriorating pleasures and money-making, in vainglorious and ludicrous follies, conventional prevarications, and the sophistical etiquette of fashion ? Does His word exhort us to make our lives as forced, artificial and unnatural as we can, or to impair our own health and that of our children and injure ourselves and others by battling frantically for a livelihood and crushing all competitors, whilst our very souls are absorbed in the quest of gain or notoriety ? The precise contrary. The God and Father of all enjoins, warns, entreats us, individuals and nations alike, in every part of His word, to bethink ourselves of the " things belonging to our peace," to work righteousness, to forsake evil, to love one another, and bear each other's burdens, to be placable, and render blessing for cursing ; and promises us again and again that He will then bless us beyond all our asking or thinking, removing far from us all danger and ill, sickness, pestilence and plague ; for it is not " willingly " <sup>1</sup> that He afflicts nor grieves the children of men (Lam. iii. 33). And lest we should doubt His power to do all this, He tells us expressly, " the Lord's hand is not shortened that it cannot save, neither His ear heavy that it cannot hear ; but your iniquities have separated between you and your God, and your sins have hid His face from you that He will not hear." " Return, saith the Lord, for I am merciful, and will not keep anger for ever." <sup>2</sup>

<sup>1</sup> Heb. " from the heart."

<sup>2</sup> Isa. lix. 1, 2 ; Jer. iii. 12.

## 44 MODERN SCIENCE AND CHRISTIANITY

But who of us believes His words ? Are we not a superlatively sapient generation, all but omniscient ? Is there " anything beyond the reach of modern science " ? What with " protection " and commercial treaties, political economy and scientific agriculture, we hope to be fairly sure in future of our daily bread ; to make tuberculine, serum, antipyrine, etc. our catholicon against mortality ; to ensure the prosperity of nations by utilitarian legislation ; to solve our " social problems " by the aid of newspaper-articles and religious and peace congresses ; to set the word of God beneath the heel of the " higher criticism " ; nay, to decide by the principles of " untrammelled research " whether He exists at all ! Independence of higher aid is our chief ambition !

No wonder that an age under this bias does not advance ; indeed, especially in social relations, sinks unmistakeably backward ! An accession of light, heat and vital force can only fall to the lot of our planet if it approximates to the sun, whose withdrawal brings cold and death in its train. And, in like manner, there is no other means of human improvement than by drawing *nearer to God* : no other formula of progress whatsoever in the universe than that !

Nevertheless, all the perversity of man cannot check or postpone the fulfilment of divine counsels. Here again the Bible triumphs over the sceptic. We do not learn from its pages that a time is at hand when, by the advancement of trade and manufacture, art and science, the globe will be transformed into a palatial hotel, supplied with every comfort, " lighted throughout by electricity," meeting all the requisitions of science or hygiene, and offering all this at the lowest boarding-house terms to a generation perfectly enlightened, and divested of all " obsolete prejudices." But then again, it has nothing to say either of a remote future when, in consequence of the undeviating action of cosmic

forces upon this darkling earth, our much-to-be-condoled-with posterity, abandoned to its own resources, will be obliged to quit Paris, Berlin and London because of their submergence under polar ice, and, nipped by frost and hunger, to huddle round the equator, until, with chattering teeth, they are eventually congealed there!<sup>1</sup> God has given to all things a weight and measure, and He has also assigned a time for everything under the sun. The insect of a day and the flowering annual have their allotted span ; the animal, the tree, man and his empires alike their season ; the sun, moon and planets in the firmament above describe their orbits in months, years, and thousands and myriads of years. Why should we suppose that there is not a period likewise decreed to the human family ? The Scriptures plainly accord with this view. Prophecy announces that, subsequently to the four empires of Babylonia, Persia, Greece, and Rome—the last of these interrupted by the season of wrath against Israel, yet destined to live anew in the ten kingdoms of Antichrist, corresponding to the ten toes of the image and the ten horns of the fourth beast—no other universal empire shall succeed, but “ the God of heaven will set up a Kingdom which shall never be destroyed.” It further shows us that the Sovereign of this kingdom will be the Messiah, the returning Christ. Finally we are warned not to despise the prediction, and instructed regarding the tokens preceding the termination of the world by the assurance that in the last days “ many shall ponder

<sup>1</sup> A writer in the *U. P. Magazine* (Vol. XIX. 492) remarks sarcastically of this theory that “ the entrance and exit of humanity thus resolves itself into a question of temperature. The period of civilization is a still narrower parenthesis, seeing that we must deduct the opening savage and closing senile epoch. In the beginning there is a dim chattering of apes, midway a chattering of Parliaments, and at the end a chattering simply of teeth.” (E. K. S.).

the words of the prophecy, and find great wisdom therein." <sup>1</sup>

We are not precisely taught—though much may be said for the notion—whether, agreeably to the wisdom of the Rabbis, and as might be inferred from the annals of creation, the Mosaic law, and the duration of the foregoing empires hitherto, the history of man from the fall is comprized in a symbolical week of six thousand years of sin and travail, to be succeeded by a correspondent millennial Sabbath of recuperation and renascence. But this is certain, that we are promised in God's word a speedy, final, glorious accomplishment of all His covenants and of His whole economy of fatherly mercy. It is doubtless to be preceded by the tremendous judgments set forth in the Apocalypse. But our God is not chargeable with this. Why have men defiled this world, and sullied every stone of its surface with blood, filling the earth with their feuds and evil passions, their blasphemy and uncleanness for six thousand years? Guilt such as that clamours for vengeance. Accordingly, whensoever its day of respite is spent, the tempest of the anger of a righteous God will mount in the heavens; His thunders peal and roar throughout the universe, and His lightnings scathe His petulant foes; and the earth, with all that is therein, quake before the wrath of its Maker. Howbeit, He will once again smile in lovingkindness upon it: for behold from henceforth there rises upward the bridal anthem of a redeemed creation, released for ever from the thralldom of vanity; and one mighty *Te Deum* resounds throughout

<sup>1</sup> This translation of Dan. xii. 4 seems to us far-fetched, and much less apposite and significant than that of the English Version (Authorized and Revised):—"Many shall run to and fro, and knowledge shall be increased"—which, moreover is more agreeable to the general usage of the verb שׁוּר here used. (E.K.S.)



the universe, swelled by the reverberating music of the spheres !<sup>1</sup>

That we designate true "progress," a progress toward a consummation satisfying every human aspiration to the full, as the most daring dreams of all the apostles of sublunary advancement can never avail to do.

<sup>1</sup> "That the inheritance of the risen saints of God is to be material as well as spiritual is expressly revealed, as it seems to us, in Holy Scripture ; and, indeed, it follows almost as a necessary consequence from the doctrine of the resurrection of the body. Nor are there wanting indications that would appear to point to this their temporary dwelling-place, after being purged and renovated, becoming the seat of the everlasting inheritance to which the people of God are destined."—Dr. Robt. Candlish : *Exposition of Genesis* ii. 237.

For a different view see Dr. Winter Hamilton's beautiful sermon, *The Final Heaven* (II. No. XVII.). (E.K.S.)

## CHAPTER II

### The Development of Modern Science

In this mass of nature there is a set of things that carry in their front, though not in capital letters yet in stenography and short characters, something of divinity ; which to wiser reasons serve as luminaries in the abyss of knowledge, and to judicious beliefs as scales or runcles to mount the pinnacles and highest places of divinity. The severe schools shall never laugh me out of the philosophy of Hermes that this visible world is but a picture of the invisible ; wherein as in a portrait things are not truly, but in equivocal shapes, and as they counterfeit some more real substance in that invisible fabric.

SIR THOMAS BROWNE : *Religio Medici* 1. 12.

#### I.—ACTUAL PROGRESS

THE denial of the “ advance of humanity ” in the preceding chapter has, doubtless, taken many readers by surprise ; for progress seems to be, and certainly is, the proper law of the creation. Every creature feels that it ought to ripen into the perfection of its kind, and further, that it is summoned toward something higher than itself—an instinct that finds expression in the growth not only of the plant and animal, but even of the crystal ;<sup>1</sup> and one does not see at the first glance why human nature alone, which, as history proves, constitutes an organic whole, should run counter to this law. The explanation—and this fact is the

<sup>1</sup> Cf. the celebrated passage, too hackneyed for citation, in Coleridge's *Aids to Reflection* ending, “ All things strive to ascend, and ascend in their striving ; all lower natures find their highest good in semblances of that which is higher and better.” (E.K.S.)

key to many of the riddles of existence—is, that the human race for the time being is not in a normal, natural, condition, that destined for it by God, but presents an abnormal, unnatural, insurgent aspect. People who deny the Fall will never make an end of the problem of existence. Neither, indeed, will those who believe in it; but they have this advantage, that they know why it confronts them, and why they cannot solve it. That, if man had not fallen, he would have gradually grown more enlightened, better, and in very truth more godlike, cannot be doubted. Enoch, the patriarch who, because he walked with God, was taken by Him to Himself, and no more seen, after he had lived here for the celestial cycle of three hundred and sixty-five years—a year for a day—is given to us as the type of a man fulfilling His design, and so of a humanity fulfilling theirs. Thus, like Elijah, we might have mounted by a Jacob's ladder, as glorified immortals, to more heavenly ranks of being. But mankind fell away from God, from light, from the fountain-head of all knowledge and all truth: fell, how dismally we can hardly surmise. Of that which a creature immediately emanating from God, sinless, and formed after His image, may have been, we, who are conceived in sin and whose nature is envenomed by it to its core, have scarcely an inkling. We are equally ignorant of the extent of the bliss of that Paradise in which the Lord conversed unrestrictedly with His creature, and the creature with a creation presented to him for eternity. It is a sufficient witness of our fall that we figure Adam at most as a blithesome, innocent child of nature. But a man able and warranted to hold direct, immediate communion with the eternal efficient First Cause, stands *ipso facto* on an elevation vastly higher than the greatest men of the present economy, sees "light in His light," and surveys life and the world in general from a vantage-ground far loftier than that of our supremest genius.

Progress towards God is indeed the law of existence through all its phases, from the atom to the cherub; a thing only possible because God draws His creatures to Himself; but this divine progression has suffered a suspension by the Fall. Meanwhile, inasmuch as God lets slip no occasion, nor ever has to pause supinely, He employs this interval for the development in the earthly cosmos of good or self-chosen evil, in order to their self-revelation, and eventually to the attainment of a more glorious goal. A manifestation of all that is in man is now the spiritual law, together with an upgrowing of all germs, a ripening of all fruits either for God's table or hell-fire; but not primarily the actualization of new and higher forms. Thus, before the Flood the idea of bodily brute force, of savage violence, the mastery of the individual in defect of a commonwealth, was first of all to be illustrated, and if we may so speak, to spend its rage. Subsequently to the Flood the idea of the massive confederation of humanity in a league never since achieved, for a distinct purpose—the erection of a Tower—became paramount; afterward, that of a people of God, sequestered from all other nations, and of a progressive divine revelation of the Law; next, that of a theocracy amongst this people, of the office of judge, of the kingship, and in David of the poet (not the least exalted function,<sup>1</sup> but misconceived in our day) and of the king; in Solomon of the philosopher, sage and monarch in one. Later on the figure of the rebuking, warning, foretelling seer was unfolded to view, and when the people

<sup>1</sup> "A more stately greatness, a more perfect order and a more beautiful variety of things delights the soul of man than can be found in nature since the Fall. And therefore poesy may seem deservedly to have some participation of divineness, because it doth raise and erect the mind by proportioning the shows of things to its desires." Bacon: *Advancement of Learning*, ii. 13. (E.K.S.)



of Israel was rejected, four overmastering ideas were represented by a profound symbolism in the four universal empires of Daniel, through the medium of four corresponding beasts in conjunction with corresponding metals (Dan. ii. vii.); with which should be compared the belief in a golden, silver, copper and iron age prevalent among various nations. Finally, after the downfall of the Roman Empire, the idea of an universal church and of a Vicar of Christ was permitted to develope, till it yielded place to the principle of the Reformation. All these are not, as a pessimistic school deems, so many endeavours of God to reclaim man to Himself that have successively miscarried and proved abortive, until in vexation and wrath He at length perforce cancels all history by a Final Judgment; but things deliberately sanctioned by a Providence fully aware what the sequel would be (*vide* Deut. xxxi. 16-21, 29). It is the successive germinancy of all the seed of evil contained in the Fall (and we cannot calculate in its rightful proportions the consequences of a world's secession from its Creator and Maintainer!), and together with that a revelation of His greater and greater Power, Wisdom, and Grace. This must continue till the great secret of wickedness is manifested, within the bounds of preordained seasons and numbers (2 Thes. ii. 7-12), and God exposes in a final judgment one after another these successive outgrowths of iniquity, avenges them, and displays by occasion of each most glorious and undreamed-of new creations of mercy; so that in the event Satan is irreparably foiled, and on "himself treble confusion, wrath and vengeance poured." Thus shall the "mystery" of God be "finished" (Rev. x. 7).

Parallel with that development of moral good and evil which is partially revealed to us in the Bible, runs an evolution throughout the nations of various oecumenical ideas. The idea of the most unbending hierarchy, of a

state rigidly compacted in all departments, and ruled by a sacerdotal King, was embodied in Egypt in a manner never since repeated ; in Nebuchadnezzar's Babylon the most unqualified autocracy under divine sanction (Dan. ii. 37, 38) ; the all-pervading conception of beauty in Greece ; in Rome that of strength, so signally contained in her very name ;<sup>1</sup> in the Renaissance that of art. In the present day the conception of science and natural philosophy asserts its predominance, whilst in the coming century that of cosmopolitan intellectual intercourse will stand foremost ; whereby we do not mean it to be understood that one or other of these principles is the loftier, but that all of them are exalted and sublime idealizations, reappearing as they do in the final frescoes of revelation amid the splendours of the renovated creation.

We gather then that evolution is not advance in the sense that a diverse and superior product emerges from a prior condition, or that one creation issues automatically from another. Rather, it is a cumulative unfolding, not of things in general, but of certain definite principles and numerical factors in turn ; as when the complete oak-tree proceeds from an acorn pregnant with the germ of all its properties ; as when the child is replaced by the adult, who possesses no fresh faculties, qualities or powers, yet displays them in a variety of new directions. That is where the Biblical theory is radically differentiated from the Darwinian. God did not " once upon a time " fashion a minute primordial cell, enfolding all potentialities and germs of subsequent creations therein, and thenceforward look inertly on whilst this egg or seed unfolded itself in obedience to the influences of natural agencies, environments and contingencies into specific, beautiful, correlated existences. We do not doubt that He could have done that, for we believe in an Almighty God. But, in the first place, His Word,

<sup>1</sup> ῥώμη.

in which we place our trust, decides that He created all things in succession after their several kinds, and secondly, the study of nature, as we shall see in the ensuing chapter, proves this to be the fact. The development of the universe is the divine articulation of higher and higher fundamental relations of number. "And God said!" We believe, therefore, that this Creator of the heavens and the earth first of all spake in sublime tones as of thunder which re-echo through the ages, before his expectant, awe-struck angelic legions, the words: "Let there be light!" *created* light, that is, as distinguished, doubtless, from the celestial. Other acts of creation followed, and angels and cherubim, the sons of God, "thrones, dominations, prince-doms, powers," gazed in wonder with eyes that probed their essences for the first time on air and sea and continents, whilst the marvellous panorama of vegetation blossomed forth. As Jehovah uttered yet higher words or numbers, for the two are tantamount, animals came into being, assuming myriad shapes and configurations.<sup>1</sup> Then spake the Elohim that sublimer sentence: "Let us make man!" And so would Jehovah have advanced, in consonance with the fitting development of man in Paradise respectively to his realm the earth, and would have uttered the word "angel" in another than its existing form, had not the work suffered abeyance by reason of the inroad of Satan

<sup>1</sup> The reader will recall a singular passage in Sir Thomas Browne's *Religio Medici*, couched in his own inimitable manner. "I hold that there is a phytognomy or physiognomy not only of men, but of plants and vegetables also. The finger of God hath left an inscription upon all His works, not graphical or composed of letters, but of their several forms, constitutions, parts and operations, which aptly joined together do make one word that doth express their natures. By these letters God calls the stars by their names; and by this alphabet Adam assigned to every creature a name peculiar to its nature."—Part II, Sect. 2. (E.K.S.)

during that seventh day wherein God rests. But when the great week of sin and woe is past, He will resume His creative act, and through majestic eras of creation bring all that He has made nearer and nearer to Himself, during *saecula* interrupted by Sabbaths and years of Jubilee, according to the septenary numbers of the Law. Not that we shall ever attain, in all eternity, to Him, any more than a figure raised to the highest power conceivable will overtake infinity.

We, therefore, find ourselves in the period of human history assigned to a development impaired by the presence of moral evil. It is appointed it to survey, study and assimilate that measure of the divine revelation immanent in creation and the Scriptures of truth that is adapted to its comprehension and moral capacity; to imbibe *that* in various degrees and ways, before being summoned by God's creative utterance into a higher state of existence. "This sore travail hath God given to the sons of men to be exercised therewith; to search out by wisdom concerning all things done under heaven." <sup>1</sup>

For it is not "infinite matter" that the world presents to mankind as an intellectual field of labour. In itself indeed the divine handiwork is of endless range, for it includes in all its parts, in the atom the crystal, the plant, the animal and man alike, such high and deep and far reaching ideas of God that it will be one of our most delightful occupations throughout eternity to peruse these draughts in the genuine celestial world of nature, with intelligence no less than wonder; inasmuch as a being superior to man would find plenty to study and to marvel at for centuries and millenniums even in one pebble-stone, in which all physics and chemistry, all the mysteries and laws of matter, and even, to the seeing eye, its entire past record from the first moment of creation, are implicated. But

<sup>1</sup> Eccles. i. 13.



man, blinded by sin and grown deaf and dumb, can no longer inspect and understand this world after a divine manner, but only in a subjective, liliputian fashion, according to his own standard, and will not at present get much further ; for too much of anything is prone to be seriously prejudicial to him, as to some new-born, sickly, puling babe. Thus he can only perceive a glimmer of the splendour of the eternal principles latent in nature, nor may pry closer, and even this glimpse he gets, not so much in one glance as by succession, in the degree in which God doles out one and then another gift to him for his mental reception. Had mankind once duly explored and scrutinized the world thus presented to it, and could find nothing fresh therein to study ; in other words, were it once to begin thoroughly to weary of this planet and become sated of life, the end would be at hand. The divine bounty having been appropriated, the class-work completed, prior to the entrance into a higher school, there must intervene the great examination and Assize of Judgment.

It is incontrovertible that at the present day a surfeit of earlier themes and schools of intellect makes itself felt. We see it in poetry and in the dramatic and plastic arts. Sculpture has embodied a plethora of men, women and children, and it is only the individual style of portraiture that continues to interest ; the " Madonnas " and " Descents from the Cross " of painting, types of character and still life, begin to pall upon us. The new schools no longer care for the actual, they affect the fantastic, repulsive and unnatural. We see the same tendency in fiction, the various classes of character are too familiar ; the fashion of to-day, in quest of novelty, dotes on vapid extravaganzas, morbid humanitarianism, and " psychological studies." Architecture itself, an art once almost exclusively dedicated to the service of religion, aims at grotesque effects, that it may not be for ever copying the Gothic and Renais-

sance styles. It is so in the intellectual world. The flagging of interest in philosophy is largely accounted for by the fact that here, as well as in religion *considered as a mere science*, all has been said that can be said, so that it has been justly remarked that "theological questions no longer interest the people!"

But God Who feeds His family day by day, cares also for their intellectual nourishment. By the agency of Copernicus, Newton, Kepler and others, He has opened to us vast and exalted glimpses into His creation, acting as so many incentives to observation and further study of the universe, and has tendered to us for this end the telescope and microscope; for each discovery happens "when the time is fulfilled." By which means He has indicated to our jaded sensibilities a new area of mental research; and it can perhaps be said that the task of the new generation lies in the scrutiny and application of natural forces. This, too, is a grand and worthy function for the human intellect.

However former nations have surpassed us—Egypt in a solid framework of polity, Greece in art, early Rome in civic and political aptitudes, later Rome, in common with Persia and Assyria, in luxury and pursuit of pleasure, and the Middle Ages themselves in devotion to philosophy and religion—we excel them in turn in acquaintance with the physical world. The names of such sciences as chemistry, geology, geognosy, micrography, formerly unheard of, teach us this fact, although the ancients were by no means so ignorant of nature as many ignorant people fancy; for the names of Hippocrates, Aristotle, Aristarchus the Samian, Hipparchus, Archimedes, Vitruvius, Euclid, and others, will ever be recounted with honour. Still, the great impulse to natural science dates only from Copernicus, Newton, Kepler, Linnaeus, Herschel, Cuvier, Laplace, Arago, Humboldt, Kirchhoff, Bunsen, Liebig, Tyndall, Helmholtz, Edison, and others too numerous to mention.

## II.—THE PROCESS OF UNIFICATION

(i.) *Its Basis Nicety of Mensuration*

There is an easy means of measuring the progress made in this department. If a man desires to know how deeply a people is tinctured with science, he need only ascertain what the language designates its standard of measurement *par excellence*. The savage employs for this purpose the length of his hand or foot or arm or stride, a variable magnitude by which each person is constituted his own standard. Till a hundred years ago the not very sharply defined "line," reckoned at the tenth part of the equally inexact thumb's breadth or inch, sufficed scientists. Then came a need for more precise measurement, chiefly in consequence of the advance of astronomy, a science entirely founded on the nicest mensuration; and so, from an exact calculation of the circumference of the earth, the *meter*, or forty millionth part of that circumference,<sup>1</sup> came into vogue as a unit of measurement, and the millimeter for scientific purposes determined punctually up to a hundredth part. But that is far too coarse a scale for any micrographer of the present day, and so the micron, or thousandth part of a millimeter, is placed at his service. Yet even the micron will soon prove too large for us; we already possess micrometers measuring very precisely the ten thousandth part of a millimeter. Accordingly the once invisible blood-corpuscle is to our present science a considerable body in comparison with many infinitesimal bacilli, and one whose diameter and various dimensions may be measured, and its transformations brought under inspection. Nevertheless, this blood-corpuscle resembles in content a cube with sides of only  $\frac{1}{8000}$ th of a millimeter's dimension, and is, by an easy computation, just *a hundred and twenty-five thousand billionth part of a cubic meter*, a

<sup>1</sup> The measure, however, is not strictly correct. (E.K.S.)

figure, that is, the ciphers of which could not be reckoned up by a man *in thousands of years*.

To count a million he would require more than a week. How long then for the bacilli which the microscope measures, the largest of which—the anthrax<sup>1</sup> bacillus—would find room for a hundred millions of its kind in a cubic millimeter? So far have we now penetrated into the depths of the infinitely minute! And not less far into the expanses of space. A second on the astronomical meridian—and astronomers calculate by tenths of seconds—is equivalent to the twentieth part of the thickness of a hair; yet such a second, ascertained to be the parallax of a star, implies that this star is distant from us 4,200,000,000,000 (German) miles; and this is termed “stellar distance,” and is used in turn as a unit for the measurement of the distance and diameter of constellations or nebulae.

In order to have an invariable standard always easily accessible, some scientists now propose to take the length of the undulation of the yellow ray in sodium (.00059 millimeter) as such. It is with “light-time” that we already measure the vast distances of the stars. In that case we should literally take the ray of light as our measuring rod and scale, and compute in terms of it both the utmost magnitudes of the universe and the infinitesimal microbes of a drop of water. A great and poetical step! Seeing that number is the rule and law of the creation, exact measurement and numeration is the indispensable basis of all natural science.<sup>2</sup> And so in the present day

<sup>1</sup> Germ. Milzbrand.

<sup>2</sup> The old doctrine of Pythagoras. Amongst the moderns, Descartes was perhaps the first to turn his searching gaze in this direction for a radical principle. “Naturae mysteria” (says his epitaph at Paris) “componens cum legibus Matheseos, utriusque arcana eadem clave reserari posse ausus est sperare.”  
(E.K.S.)

“It is Number that determines the three primary conditions



a stately and, as founded on number, mathematically demonstrable and demonstrated cosmology has been erected on the basis of such mensuration, which, combining truth with beauty, is more bracing and invigorating to the mind than the boldest flights of poetry. For it is a delusion to suppose that our day is more poverty-stricken in this respect than any former age. The amount of poetry in the world is probably a fixed quantity, and possibly man's receptivity of it too. A distant mountain appears of a vapoury blue, but on closer scrutiny is seen to consist of the same varieties of earth and stone as the adjacent soil. In a similar manner, ancient times seem grander and more romantic because it is the sublime and poetically truthful elements that have stood their ground, whilst the petty and prosaic have vanished. The old Egyptians

of existence, Time, Space, Matter. A continuous series of recurring units, in arithmetical progression—that is Time. And what is Space to our minds but number set beside number in geometrical progression? Apart from magnitude, the conception cannot exist. The entire world of forms is referable to the visibility of the relations of number: it consists of straight lines or curves, or both. Analytic and synthetic geometry evince that every curve and straight line can be expressed by an algebraic equation or formula, that is a number which represents absolutely and potentially all the properties of such a line. Thus

$\frac{x}{a} + \frac{y}{b} = 1$  is the equation of the straight line.

$x^2 + y^2 = r^2$  of the circle,

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  of the ellipse,

$y^2 = 4px$  of the parabola,

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  of the hyperbola, and this last implicitly contains the law of the asymptotical approximation of two lines that never touch; a beautiful symbol of the relation of the creature to its Creator throughout eternity."—Bettex: *Symbolik der Schöpfung*, p. 303.

and Babylonians, perhaps, were equally shrewd and poetical with ourselves, but no less prosaic and starched either. Certainly that great universal conqueror, the Roman, with all his grandeur, was in many respects, indeed in most—politics especially—a genuine *bourgeois*. Cato is a notable instance in point; and we know that when Caesar crossed the Alps, far from relishing those beauties of nature which were a novelty to him, he employed his time, as he fancied, more to the purpose in jotting down a treatise on grammar.<sup>1</sup> Our modern philosophy, our machinery and naval armaments and engagements, have their rugged poetry too for the man who can appreciate it. The St. Gothard express, as it burrows deep into the heart of the granite through a tortuous tunnel, drawn by snorting, coal-devouring, water-quaffing monsters, and winds underneath the mountain in and out in spiral coils, issuing with a roar and screech only to rattle on through rocky gorges, over dizzy viaducts, past foaming mountain torrents without pause; or the greyhounds of the Atlantic, the *Oceanic* or the *Kaiser Wilhelm*, living palaces of steel, vitalized by engines of 30,000 horse-power, hastening with arrowy flight through tempest and surge, iceberg and fog, in five or six days from the Old World to the New, freighted with several hundreds of passengers, are spectacles no less grand, poetical and soul-stirring than any of ancient times.

Let us observe for a moment one of our ironclads, a modern behemoth with pachydermatous coat of steel, vomiting smoke and steam from its nostrils, scattering far-illuminating rays of electricity from its eyes, its voice the bellowing of cannon, ready to inflict mortal wounds with its sharp spurs—observe it to the “heart,” where the forces of nature are unshackled that they may drive the leviathan like a shaft across the waves. Yonder slum-

<sup>1</sup> Suet. *Vit. Jul. Cæs.* LVI.

bers the engine, a mysterious, awesome monster—its cylinders like iron bellies, its limbs beams and trunks of steel, with its bright crank-arms, under which man moves like an insect, and which yet are his workmanship. Cold and inanimate, stiff and stark, the leviathan awaits the warm breath of life. But a word of command resounds; one pull at the lever, and indomitable energy animates the seeming carcass. With a creak and groan the giant stirs his limbs, the piston-rods move to and fro, at first painfully as though in weariness, yet ever quicker and quicker, and, like fettered Samsons, turn with the colossal cranks; soon, as if lashed to frenzy, for the propeller-engines work with inconceivable rapidity, they seem to pursue each other in unrelenting chase; every part of the machinery throbs, propels, drives, revolves; if ten thousand men were to try to retard that engine now, their arms would be as chaff and stubble; it would tear them off or mangle them! But the individual on the bridge moves the lever again, and the pulsation slackens, and soon wholly subsides; ere long life has vanished, and the vessel lies a motionless hulk once more. Thus I think it must be on that day when God speaks a creative word to the universe. Then do glowing suns career through space and dance therein, planets whirl round them, comets speed from one to another, infinite life circulates on every hand; and the anthem, loud as thunder, of the spheres echoes through unfathomable space.<sup>1</sup> Does Omniscience

<sup>1</sup> "Mazes intricate,  
Eccentric, interwolved, yet regular  
Then most when most irregular they seem;  
And in their motions harmony divine  
So smoothes her charming tones that God's own ear  
Listens delighted."

—Milton: *P. L. V.* 622-7.

Cf. Cic. *Som. Scip.* V., and Shakespeare: *Merchant of Venice*, Act V. Sc. 1. (E.K.S.)

ordain that "it is enough"? He utters His voice again, life evanesces, and all things lie still, inanimate, quiescent "world without end"!

To revert to our present natural philosophy. Whilst the older students of nature, observant more of her forms and organisms, compared these together, and strove in almost endless fashions to classify them (like Aristotle in ancient, and in later days Linnæus, with Buffon, Jussieu, Lamarck and others), modern science, thanks to the great progress of chemistry and physics, seeks to investigate the common principles of all phenomena. Fain would she elicit the secret of matter, though hitherto without much success. Does not Plato tell us, "Matter is a thing very hard to be understood"?<sup>1</sup>—the truth being rather that the nearer we get to it, the more inexplicable and incomprehensible does it invariably seem. Newton ascertained its indestructibility long since, and declared that all natural phenomena are traceable to the attraction and repulsion of atoms. Dubois-Reymond concludes in like manner that "the knowledge of nature, or, to speak more accurately, the knowledge of natural science is the reference of the modifications of bodies to the motion of atoms impelled by central forces, or the resolution of the processes of nature into atomic mechanics."

### (ii.) *Elemental Atoms.*

We propose to reconnoitre more closely this enigmatical smallest particle of matter, together with the forces acting upon or inherent within it. "All our present natural philosophy," says Büchner, "rests on the law of the conservation of energy and the principle of the conservation

<sup>1</sup> τοῦ ὁρατοῦ ὑποδοχὴν, ἀνόρατον εἶδος τι, πανδεχὲς καὶ δυσαλωτότατον.—*Tim.* xix. 51. The word ὑλη is not met with in Plato's genuine works. (E.K.S.)



of substance " ; in other terms, we must refer all material transmutations in nature neither to a new creation nor to an annihilation, but only to a rearrangement of elements.

It is a conundrum that has occasioned much controversy whether this selfsame matter is inseparably and primordially endued and interknit with forces ; whether, that is, the one could exist apart from the other, or not. For practical purposes, we can say either that dead matter has no existence, or (what comes to the same thing) however it may exist, must remain for ever beyond our knowledge : we cannot feel or hear or see or be in any degree sensible of it ; for what we do perceive is not its inherent essence, a thing for ever concealed from us on earth, but merely the evidences of its presence in the force or forces which emanate from it. For example, matter has ponderability ; it exerts a power of attraction. We see matter. Why ? Because its molecules or atoms, in process of perpetual motion, refract, absorb or reflect the rays of light ; we see then an exhibition of force on the part of matter. We hear matter, because its minutest particles are in a condition of restless vibration, and communicate this motion to other molecules, thus causing sound. Weight, colour, and sound are manifestations of matter, which, according to the great discovery of Robert Mayer, are to be conceived of in general as modifications of motion. Physics and chemistry confirm this view. The tiniest drop of water which is constantly being exhaled, the least particle of iron which imperceptibly but unintermittently rusts, is not rightly to be regarded as an inanimate portion of inanimate matter, but as a microcosm of billions of atoms, borne in rotatory flight round and round each other by inexhaustible reserves of force—vortices continually producing new configurations in reciprocation with surrounding matter ; an exhibition, in short, of absolutely boundless animation !

What has led us to this conception of specific atoms which we have never set eyes on? Simply the fact that chemical elements (those bodies, namely, which chemistry cannot for the present further subdivide) form combinations with one another, not in any casual intermixture, as must be the case on the hypothesis of one uninterrupted scheme of matter, but only in definite quantitative relations, and by an unalterable standard. Eight parts of oxygen alone combine with one<sup>1</sup> part of hydrogen, 16 O with 2 H, etc.; but never  $1\frac{1}{2}$  O with 5 or  $7\frac{3}{4}$  H. Consequently, eight parts by weight of oxygen are the equivalent of one part by weight of hydrogen. Similarly with all the other elements.

It is an interesting fact that in their entrance into coalition these atoms show very various predilections or "affinities" toward each other. Those, however, which, like the metals, display the closest resemblances, and belong, as it were, to the same family, seeming to have their common origin in some undiscovered radical, will have least, or nothing at all, to do with one another. Nevertheless, if they do combine, their product or offspring, says Liebig, manifests in an intensified degree the characteristic virtues and defects of the family; whereas, if two atoms of dissimilar families, which for the most part betray much partiality for one another, become allied, a perfectly new body is formed, in which the parent stock cannot be recognized. These are chemical "elective affinities"; and here it is opposites that are mutually attracted. Why an atom of iron should prefer to unite with an atom of oxygen rather than with an atom of chlorine or silver, is among the chief mysteries of creation. As for the amount of these elements or provisionally indivisible bodies, Mendeléeff and Lothar Meyer have shown that they periodically recur, according to their properties, and that as there

<sup>1</sup> More exactly 1.008 parts of H. (E.K.S.)

are tones in music expressed numerically by "do, re, mi, fa, sol, la, si, do," there is also a material substratum which, subdivided into octaves, exhibits *ad infinitum* similar phenomena in a fresh key: an observation which has already enabled us to discover so-called "new" elements, such as Germanium. By the theory of the former writer there are a clear hundred of chemical elements, namely, two septenary groups, five groups of seventeen members apiece, and hydrogen. Seventy-five of these are known, which, judged by their practical value, divide themselves into three groups. The first contains eighteen elements. They are those most widely distributed over the surface of the earth, as well as the most indispensable for the animate creation. That yet more wonderful phenomenon, life, cannot dispense with the services of these wonderful units of matter in building up and animating its structure. But why this list rather than any other? Aluminium, bromine, calcium, carbon, chlorine, fluorine, hydrogen, iodine, iron, magnesium, manganese, nitrogen, oxygen, phosphorus, potassium, silicon, sodium, sulphur. It will be observed that they are by no means those with which we are most intimate. The second group embraces twenty-three elements, not so generally distributed as those above-mentioned, and, accordingly, so far as we know, not absolutely requisite to life. They form, it would seem, rather luxuries, articles of ornament, "fancy-goods," if inexorable nature recognizes such things. Still they play a great part in her economy; amongst them are to be noticed by far the most familiar metals: copper, gold, lead, nickel, platinum, quicksilver, silver, tin, zinc, etc. In the third group are some thirty elements, which occur so rarely in nature that their very functions continue unknown to us: such as beryllium, didymium, xenon, cerium, tellurium, zirconium and others. Mysterious parties these, roaming the earth a little *incognito*; they might, for aught we care,

take themselves off; and yet who knows whether we should not speedily rue their absence!

A chemist long conversant with these elements thus characterizes them: "It is a very presentable company," he says. "Here are found aristocrats and democrats side by side; specimens of the phlegmatic and sanguine, self-assertive and coy, strongly-marked and ill-defined characters; lustrous and invisible, sedate and gentle, or again nervous and cross-grained members, assuming, upon the slightest agitation, a tremendous passion; the active and self-indulgent or vain; hard and weak; proud, reserved, and sympathetic; pliable, ethereal and gross temperaments; drones and toilers; monarchs and vassals; intermediaries and mischief-makers; in brief, elements of the most diverse humours assembled together!"<sup>1</sup> Many are gregarious, occurring in nature almost always in certain combinations, as iron with oxygen in iron ores, lead and zinc with sulphur, aluminium (of late so much talked of) in company with silicon and oxygen. Very few wander by themselves unsociably upon their way.

For all that, in spite of this capacity for combination, these bases and individualities of matter possess a wholly ineffaceable identity. However many times an atom of sulphur may undergo combustion, or be given off as sulphur dioxide ( $\text{SO}_2$ ), or liquefy as sulphur trioxide ( $\text{SO}_3$ ), or as iron pyrites ( $\text{FeS}_2$ ) form a compact mass, it is not in the least degree changed, and loses not one of its properties. Once released from the combinations it has entered into, this atom meets us again in its old state, with its peculiar power of attraction, its ascertained chemical affinities, its habitual specific gravity, indestructible by steam-hammer, hydraulic pressure or blast furnace, a positive living power. Were stones, plants and animals to perish, and the entire human race to disappear from the globe; were the stars

<sup>1</sup> Büchner; *Die Chemischen Elemente*.



to be resolved by a general conflagration into the "primordial nebula," an atom of hydrogen would still be an atom of hydrogen, with all its characteristics, which nothing short of a Divine fiat can annihilate to all eternity. Truly these are mighty manifestations of indestructibility on the part of so-called "dead" matter to any thinking mind.

Of what size and shape shall we conceive of these atoms and minutest parts of bodies as being? The question is not easy to answer. Some physicists are disposed to treat them as immaterial points, *κινητά*, or centres from which material forces radiate. A conception, plainly, but no elucidation. Others figure each atom to themselves as the centre of an elastic envelope of ether, from whence forces emanate. The simplest theory is that of a Frenchman, according to which each elementary atom has the same contour as the crystals of its element. Many researches have been set on foot to determine their probable size. Goudin concludes from microscopical observations that the interval between each atom does not, in all likelihood, amount to more than a ten-millionth of a millimeter, so that a man would require two hundred and fifty thousand years to count those contained in a pin's head. Lord Kelvin infers from experiments with "light waves," capillary attraction and the motion of gases, that the atom and molecule are not incalculably minute, but that the diameter of the molecule lies somewhere between the millionth and hundred-millionth part of a millimeter. A quarter of a quadrillion of atoms of hydrogen weigh about a gram (Mayer). It will be seen that these figures are at any rate not inconsistent with one another; if they are at present somewhat dubious estimates, it would be unfair to scout them as valueless. Even science must at first feel her way, and attempt to fix approximate limits, if she is hereafter to arrive at data beyond dispute.

That matter is not continuous, but, as the phrase now runs, "discrete," is also proved by "isomerism," or the fact that bodies arise with new properties out of the same elements united in the same proportions; assuredly only because of some different collocation or intertexture of particles. The fragrant ethyl acetate and the offensive butyric acid may be adduced as instances.<sup>1</sup> Conversely, the same bodies, probably for the same reason, not unfrequently display different physical properties, a diverse specific weight, crystallization, etc., as carbon, occurring as diamond, and again as graphite and coal; or phosphorus, at one time yellow and susceptible of crystallization, at another red and amorphous. Thus not only the quantity, but also the shape and disposition of the atoms influence the external appearance and even the properties of bodies.

But the atom is not sufficient for our scientific observations; and we have, therefore, invented molecules, or "shamefaced atoms," as Schopenhauer terms them. Formerly this expression conveyed the notion of a combination of two or more atoms of diverse substances; and a "molecule of water," consisting of one atom of hydrogen to eight of oxygen, was employed in this sense. But we now recognize molecules of hydrogen and oxygen as well, that is, co-acervations of atoms of the same substance.<sup>2</sup> What is it that induces us to entertain that assumption? For it goes without saying that no one has ever seen a molecule. Because it has been noticed that elements usually occur in a "fettered" condition, so to speak. If every atom of oxygen, for example, were constantly unshackled, it would devour us like a consum-

<sup>1</sup> Ethyl acetate has the formula  $C_2H_5O.C_2H_3O$ , butyric acid  $C_4H_8O_2$ .

<sup>2</sup> "Molecules consist of atoms in a certain state of distribution and motion."—Mendeléeff: *Principles of Chemistry* (Eng. Trans.), I. 323. (E.K.S.)

ing fire. Indeed, fire is nothing else than the rancour and gusto with which atoms of oxygen fling themselves on other elements. To explain their inèrtia, on the other hand, it is supposed that two are perpetually fastened together, and reciprocally neutralize each other, like a pair of chained galley-slaves, either of whom longs to seize a different article of booty, so that they dance round and round in impotent passion. But should their avidity be raised to the highest pitch by means of heat, electricity, or the vicinity of other energetic elements, these atoms snap their bands asunder, attack other forms of matter, and form composite molecules.

These atoms and molecules are not strictly contiguous. This is abundantly proved by the fact that the hardest steel expands through heat, and is contracted by cold. It has been inferred from their action that the total sum of molecules in a cubic centimeter of air composes only a third of a cubic millimeter, or but a three thousandth part of the entire apparent volume. They would be much smaller if other calculations are accepted. Flammarion concludes that a cubic centimeter of air contains a sextillion molecules, and adds that if they were placed in a straight line at a distance of one millimeter apart, they would form a road of two hundred and fifty trillion leagues in length, a distance far greater than that of Sirius from us. Viewed with the mind's eye, then, a bullet is in reality not an uninterrupted, concrete, solid mass, but resembles more those swarms of gnats that play in the beams of the sun, or—for extremes meet—those remote stellar heaps or nebulae which consist of millions of suns in revolution round one another. These molecules also whirl furiously round and round each other at a pace of which we can form scarcely any conception, amounting, e.g. in the case of a molecule of hydrogen at an ordinary temperature, to a mile and a quarter per second, which is four times the velocity of a cannon-ball.

Atoms are held together and grouped in molecules in consequence of forces acting both by attraction and repulsion, probably not without the agency of electricity. Flammarion says that "we cannot grasp adequately the activity of these atomic forces. If we heat a kilo of iron from freezing to boiling point, it expands nearly  $\frac{1}{800}$ th,—to an insensible degree, that is to say; yet the force effective of this expansion would be adequate to lift ten thousand pounds a yard high. Gravitation almost disappears when compared with these molecular forces. The attraction of the earth acting on such a kilo weight is quite insignificant in comparison with the reciprocal attraction of its molecules. When one kilogram of hydrogen unites with eight kilograms of oxygen to form water, an activity is set in motion that would suffice to raise the temperature of 34,000 kilograms of water one degree (Centigrade), or to lift *fourteen million kilograms one meter high*. In other words, while these nine kilograms were composing water, the molecules have fallen into an abyss, equivalent to a leap of 14,000 meters' depth taken by a ton of water, reckoned at a 1,000 kgs." <sup>1</sup>

But there is another theory, according to which we might just as well say that there are no atomic forces, but only an ethereal one, heat, for which the various atoms display a divergent receptivity. We know that even gaseous molecules would become inert and dead at a temperature of absolute cold, of  $-273^{\circ}$  Centigrade. What resources of force this heat evolves in the form of quickened vibrations of ether, may be seen by a glance at the now generally received unit of heat or caloric. By this standard, the warmth which heats one kilogram of water from freezing point to  $1^{\circ}$  Centigrade is enough to lift four hundred and twenty-five kilograms a meter high in one second!

<sup>1</sup> Flammarion : *Astronomie populaire*, p. 389.



It is well known that atoms or molecules of water sunder themselves from one another upon the transition from a liquid to a glacial state with a power easily capable of bursting iron bonds ; but we do not yet suspect half the forces which treat that unaccountable puzzle, matter, as their plaything. Not long ago an attempt was made at the Technical Institute at Vienna to measure the relative capacity of resistance of corundum,<sup>1</sup> the hardest kind of stone, and the hardest steel. It might have been anticipated that the much more yielding steel would have been crushed long before the other. As a matter of fact, a cubic centimeter of corundum broke up at a pressure of six thousand kilograms. The similar cube of steel, however, sustained more than seven times that pressure (viz. forty-three thousand kilograms), and instead of simply crumbling, was pulverized with an explosion like that of a cannon, emitting sparks in every direction, riddling the "refuge," and stoving in the engine. Evidently a hitherto unknown condition of the metal and unknown forces here came to light. At a normal temperature nitrogen resists a pressure of two thousand eight hundred and ninety atmospheres, that is to say, its molecules refuse to be compressed so closely as to liquefy under this enormous pressure, so vehement is the struggle of these atoms for freedom ; and what would it be at a temperature equal to that found on the sun ? For heat wonderfully heightens the impulse of atoms toward freedom, or their power of repulsion. Professor Dewar has succeeded in procuring several liters of liquid air by means of tremendous pressure.<sup>2</sup> However, we shall never discover how

<sup>1</sup> Otherwise known as "adamantine spar" : a crystallized mineral akin to the sapphire and ruby. (E.K.S.)

<sup>2</sup> More recently hydrogen itself has been solidified at a temperature of  $-240^{\circ}$  C., and also reduced to a colourless liquid. (E.K.S.)

the draught tastes ; for this liquid of a temperature below  $-200^{\circ}$  Centigrade would have an action on the gums and stomach like that of molten lead. Professor Pictet met with a burn from one drop of such a liquid which only began to heal after six weeks. And what is the secret of the force of smoking and smokeless powder, melinite or dynamite, or the still more frightful nitro-glycerine ? Simply this. Here are atoms which have been coerced into a tentative, or, let us call it, an uncongenial union, and, destitute themselves of the power to dissolve this wedlock, slumber under restraint, sullenly brooding ; but when, by dint of spark or fire a vital breath reaches them, they wake ; and, wrathfully bursting their manacles, pulverize everything nigh at hand in a resistless effort to obtain room sufficient for the expansion of their characteristic activity.

All such terrestrial combinations of matter, viewed in their true light, are more or less unfortunate matches, reluctant and fugitive conjunctions. A little more heat, ten thousand degrees or so, a veritable trifle measured against the myriad degrees on the glowing surface of the sun, would suffice to resolve these material amalgams, which we designate matter, into their constituent elements amidst gigantic explosions, and instantaneously to transmute even those forms of it seemingly most passive, such as stones, into whatsoever different phases of existence their atoms, now so stolid and inanimate, in a violent assertion of independence, would then assume. Thus the view of the mystic Jacob Boehme, according to which, through the fall of Lucifer, the creation proper, or truly divine matter, has been cast into strict "durance," is one that tallies curiously with the most recent chemical and astronomical suppositions, and is no less coincident with the prophecy of Peter foretelling that in the conflagration of this world "the

elements shall be dissolved " with a " rushing sound." <sup>1</sup>

The further and deeper we try to pierce into the essence of matter, the more mysteries accumulate upon us. If we are bound to assign to the atom a primal unit, an absolute homogeneity, it is not discernible how one such atom can differ qualitatively from another, seeing that qualities depend on a juxtaposition of divergent things. It remains as inconceivable why and how such a body which, notwithstanding, forms a whole, and consequently should be entirely self-sufficing, can be drawn to another extraneous whole, perfectly alien to it, nor how and why this attachment, which is most acute in the case of atoms the least germane to each other, is often aggravated to a pitch of frenzy. It is incomprehensible, too, how a unity should ensue from the collocation, however intimate, of two kinds of atoms, and should have a wholly dissimilar appearance and possess properties distinct from either of its parents. The chemist, doubtless, sits at the source of all phenomena, at the heart of things ; but then, unfortunately, even he has to make the same confession regarding his favourite study as the old philosopher <sup>2</sup> made when asked by a king touching the mystery of the divine nature, that the longer he mused upon that subject, the less he fathomed it ; and must content himself with studying to the best of his ability the inscrutable forces of matter, and the laws of its manifestation.

Not only in the microscopic world do tremendous forces drive atoms in an eddying dance, but other forces impel in a similar vortex the great bodies wheeling in

<sup>1</sup> ῥοιζήδων . . . στοιχεῖα λυθήσονται—2 Pet. iii. 10. Cf. Isa. li. 6. The Stoics also believed in this final conflagration, to which Lucan refers in the line : " Communis mundo superest rogos ossibus astra Mixturus " (vii. 814) : and yet more particularly Seneca (N. Q. iii. 28, *Dial.* vi. 26). (E.K.S.)

<sup>2</sup> Simonides (Cic. *De Nat. Deorum*, i. 22).

space. Such is attraction, to begin with, then heat, light and electricity; and yet these are only various expressions of one and the same primordial force. For they can always be interchanged with one another. When we consume coal, a combination of carbon and oxygen results; hence comes heat, translated by the steam-engine into motion; and we now see every day how that may be transmuted into light. Now this light (e.g. in photography) produces chemical combinations; whereby the circle is completed, and in so far we can say that it is a *single* force which moves the suns and the motive-centres of matter. Now, since we are aware, as noticed above, exactly how much motion a certain quantity of heat gives out, or how much heat a specific chemical alliance begets, we might, literally speaking, learn to store up force or forces, to put by sunbeams, and ten years after or a hundred miles off, to turn them to account at pleasure in the form of motion, chemical force, light, heat or electricity. In this event, the apprehension of the unity of all forces and their commutability would turn out to be the greatest and most prolific thought of the nineteenth century, as in the previous century the discovery of the laws of gravitation constituted the starting-point of our modern scientific cosmology.

Sensible impressions in general, also, are mere perceptions of molecular motion. Feeling, hearing and seeing are therefore identical, graduated effects. In a darkened room, where a steel disc quivers ten to twenty times a second, the finger is sensible of a vibration; if it moves sixty-four to thirty-two thousand times, the ear hears a note more and more high-pitched; if it vibrates still faster, the finger feels warmth and next heat; after four hundred and fifty billion vibrations per second, the eye beholds a reddish glimmer, growing lighter with every acceleration of the motion of the molecules, and



terminating in a white incandescence comprehensive of all colours whatsoever. We may accordingly say that the ear sees the sound and the eye hears the light, and it is a conceivable possibility that in other beings than ourselves a single organ might be able to perceive the foregoing molecular motions successively as a mere intensification of the same sensation, or as a kind of modulation of shades of a *single* colour.

The "conservation of energy" is the name of that law of nature by which no force, or ever so minute a portion of a force, is lost, but only metamorphosed. The projectile of five hundredweight that recoils from the plates of an ironclad, no doubt, loses its momentum instantaneously; but this is replaced by a heat both in the ball and plate precisely adequate to reproduce the antecedent motion and the antecedent shock, or a chemical transposition re-enacting the like effect; and so on for ever. We see then matter nowhere disjoined from force, nor force from matter; for of an absolute void in nature we know nothing. But this visible or tangible matter is enveloped in an interminable, unfathomable ocean of finer, nearly immaterial matter, almost infinite in extent, the true residence of force. Educated races, like the Indians and Greeks, have long ago had surmises of a rarefied matter filling space, and known as "ether," from whence arose the constellations. Ovid tells us in his *Metamorphoses* that

"The crystal ether o'er the air God set,  
Buoyant, unstained by sublunary dross";<sup>1</sup>

and we find the same conceptions in Plato, Spinoza, and many other philosophers. The genius of Secchi brought

<sup>1</sup> Haec super imposuit liquidum et gravitate carentem  
Aethera, nec quicquam terrenae faecis habentem.

Ovid. *Met.* I. 67, 8.

into scientific acceptance the notion already postulated by Euler and Huyghens of a liquid diffused through interstellar space in which all bodies float, by which indeed they are impelled in their orbits; and now some physicists suppose that a condensed mantle of ether (Dynamide), from whence all force emanates, englobes each atom and molecule. We can form no idea of the rarefaction of this universal ether. Babinet computes that the cometary matter is one hundred and forty thousand million times thinner than our air, and for that reason gave it the soubriquet of *des riens visibles*; but in the case of ether other students, on the basis of various calculations, talk of matter of six hundred billion times more tenuity than any known on our earth. Thus the atmosphere, compared with ether, is many million times heavier than gold poised against air. Such must be the case: otherwise, in consequence of the resistance of this ether, an incessant hurricane would sweep all that exists on the globe away into space, and the surface of our planet would resemble an uprooted chaos.

### (iii.) *The Correlation of Worlds.*

Having examined the bodies within reach on our globe, and their combinations, with the forces that set them in motion, and thus ascertained both the indestructibility of matter and the conservation of energy, one of the most interesting of problems that engrossed science was the question whether matter, as we know it on the earth, were the same as that which forms the bodies of the universe in general, obedient to the same laws, endowed with the same properties. A hundred years ago there was no hope that we should ever be able to answer this question. Even Sir Isaac Newton, the demonstrator of the universal prevalence of gravitation, would probably have smiled ironically at the dream of discovering whether

common salt or quicksilver were extant on such and such a star. Who would have thought that this information had been reaching us in each pencil of light for thousands of years? Who suspects the further accessions of knowledge which the ray of light may still conceal within it? Frauenhofer detected in the ray of light as it was disintegrated, so to speak, by the prism, and analyzed into its seven principal colours, numerous lines, finer or broader, black or coloured, the number of which soon grew to hundreds and now amounts to thousands. Kirchhoff and Bunsen found in 1859 that these lines originated in the chemical constituents of the ignited or illuminating substance, and that each constituent produces specific, invariable lines, which appear constantly in the same place on the spectrum; sodium, for example, as a very bright, broad, yellow stripe, thallium as blue, rubidium as three green lines, etc.

It was therefore possible to read distinctly in the least ray, the tremulous light of which twinkles across to us from the remotest fixed star, whether oxygen, gold, iron, etc., are found in that world; whether in a gaseous or fluid state, hot or cold; surely amongst the most remarkable facts in nature! One can imagine with what ardour astronomers turned to the inquiry whether our own elements pervaded the universe, or some other unknown bodies. The reply was astonishing. Those forms of matter that compose terrestrial air and water, stones and plants, our blood and bones, are diffused throughout the entire universe, and are everywhere entirely the same. Even "helium," hitherto supposed to be confined to our sun, has been lately detected by Professor Palmieri in the lava of Vesuvius. This identity of matter, this invisible, all-inclusive bond of union, is a great and significant truth!

How voluminous is this lexicon of radiation may be

gathered from the fact that the well-known spectroscopist, Lockyer, has been engaged for years upon an "edition" of the solar spectrum on an enlarged scale, which is to exhibit as far as possible all Fraunhofer's lines. The completed picture will be over a hundred yards long, and he makes use of more than a hundred thousand observations for the work, and of two thousand photographs of the spectra of different elements. One word regarding the exactitude of the registration. Swan found that the spectrum analysis reveals to us the presence of a *two-millionth* of a gram of sodium. Lang has shown the same thing to hold for a *fifty-millionth* of a gram of *thallium*! Moreover, Kirchhoff and Bunsen have ascertained by careful experiments that a *three-thousand-millionth part* of a gram of sodium in combustion in a flame can be clearly detected by virtue of the spectroscope!—a quantity, that is, which the eye can no longer discern even with the aid of the finest microscope, nor the sense of smell perceive, nor the tongue taste, and which neither our organs nor any human instrument or chemical reagent can discover! We almost shudder in the presence of this unerring language of light, the revealer of secrets the most recondite. Lockyer has found that the spectrum analysis furnishes quantitative analyses as well: in the case of an article of gold alloyed with copper the relative amount of the two metals could be estimated to a thousandth part by the decrease in the spectrum lines. Finally, it was by means of spectrum analysis that Crookes isolated the element thallium.<sup>1</sup>

We are constantly learning better to read this luminous manuscript. Not only does it describe to us the chemical constituents of distant constellations, not only does it tell us whether a sun a thousand million miles off is approaching or receding from us, and the velocity with

<sup>1</sup> Five new elements in all have been thus detected. (E.K.S.)



which it moves,<sup>1</sup> but the periodical duplication of certain lines shows us whether the faint dot of light, which even the strongest telescope cannot appraise, may or may not consist of two or more bodies, perhaps of gigantic size, in process of revolution round each other. Mizar, the central star in the pole of Charles's Wain, a colossal sun excelling ours in magnitude seventeen hundred times, the period of whose orbit is one hundred and five days, and which is equal to five hundred and ten million earths in size, is a case in point.<sup>2</sup>

Moreover, what a horizon dawns upon us in the amazing discovery of Professor Röntgen ! Here is a new physics of light—rays which are not refracted, nor concentrated by lenses, which pierce metals like glass, glass itself with less facility than mica, and wood and leather more easily than either ! Yet not absolutely new after all. Aristides, the friend of Marcus Aurelius, relates in his *ἱεροὶ λόγοι* that he had seen his internal organs ; indeed, the Egyptian priests seem to have known of this translucency of bodies. Hippocrates tells the same story ; and a long-standing friend of the author, a late captain in the German army, assured me that he used frequently, in company or at a concert, to see all present for several moments, as skeletons, much to his own annoyance—a Röntgen form of introspection which, however, at the time was scouted as “ mere hallucination.”

The moral importance of the establishment of the identity of matter throughout the universe can be hardly overestimated. Just as in earlier centuries even men of learning deemed it not incredible that lands yet undiscovered or not accurately explored might harbour monsters resembling human beings, but with one eye or with horns or ears

<sup>1</sup> See note to page 135.

<sup>2</sup> Mizar is resolved by spectrum analysis into two component stars, revolving round each other. (E.K.S.)

reaching to the ground ;<sup>1</sup> so it was considered possible a hundred years ago that unknown and incomprehensible conditions of matter, and material or even non-material conditions, forces and phenomena, existed in the universe without any analogy in our neighbourhood. Now, however, we recognize that nothing more than deviations from stable types already familiar to us occur on our globe, and are likewise convinced that no unbridled caprice such as identifies the grotesque with the marvellous, predominates in any part of creation, but an intelligent, albeit multiform, evolution of a few fundamental types founded on natural laws. Whereas man effects for the most part something very simple by dint of complex, far-fetched expedients, God knows how to evoke with very slight, and those the plainest, materials the incalculable variety of phenomena that we find upon the earth. The entire world of crystalized forms is produced by merely modifying the inclination and length of three axes. The hundreds of thousands of vegetable organisms are constructed from the simple "cell." This scheme of things pervades the universe. The hundreds of millions of suns, planets, moons, comets, etc., in space, consist all of them of a few elements, almost all represented on our globe, and obnoxious to the same laws as those to which they are subject here. The double stars that revolve round one another describe precisely the same mathematical curves as the stone thrown by a child. Yonder as well as here the combination of hydrogen with oxygen forms water, and that water evaporates or freezes according to the existing temperature. Yonder as well as here iron rusts by oxidation ; there also a red colour is the product of vibrations of ether, and an intermixture of yellow and blue results in a green shade. Spectrum analysis certifies us that there no less than here there are found copper, lead and mercury, iron, gold and salt. Finally,

<sup>1</sup> See Sir John Mandeville's *Voyage and Travaile*.

the meteorites that fall on the earth from space testify that in the remotest regions these incorporations of matter group their crystals in accordance with the laws of mundane crystallography. In short, we are now assured that, far as matter and space extend, twice two amounts to four, and the three angles of a triangle are equal to two right angles. In other words, the Deity has devised for His whole creation only one common system of mathematics, mechanics, physics, and chemistry.

Our world, therefore, lies no longer in a state of isolation, but is a harmonious member of the great family of suns, encircled by planets or kindred globes formed out of the same matter, and subjected to the same laws; and advanced astronomy now regards the collective planets as a fair and magnificent sisterhood, the offspring of the same parent, which derive perpetually from him that new vitality that produces on their surfaces thousands of phases of life. Whereupon the thought is not far to seek that these worlds, governed by the very laws by which ours is swayed, must subserve a similar end, namely to form fixed points in space where the finite spirit, linked with matter, may attain individualization and self-conscious being. Here again, in regard to each of these bodies, analogy suggests the question whether the point of time at which the highest individualization of the spirit takes place has arrived or already passed by.

The inquiry has always interested mankind whether these worlds of light do not also stand in some direct relation to us. Modern science replies distinctly in the affirmative. Without sun there would be no wind, no circulation of waters, rain, sunshine, or light: the unfructified earth would lie barren. We are ignorant of the influences of our neighbour the moon on vegetable and animal growth; indeed we know so little about the process that we do not understand why the plant mounts heavenwards, and its

root bends downwards, nor through what subtle influence many flowers bloom in the early morning, others at mid-day or in the evening, and one only at midnight. But it is clear from tidal and other phenomena that the moon does affect our world ; and there is proof that Venus, Mars and Jupiter influence, for example, the orbit of the earth. The discovery of wireless telegraphy, again, recalls the conjecture that the " northern lights," those resplendent electrical emanations of our globe, betoken a constant telegraphic connexion of the earth at all events with its sister planets, Venus and Mars. Finally, we can gather that distant suns such as Sirius and Vega do not lie entirely beyond the range of terrestrial sympathies ; for they not only send us rays that disclose their chemical constituents, physical conditions and motions, but also funds of electricity and heat which are measurable.

It is, therefore, a beautiful and sublime truth that forces and influences flow to us from the most remote realms of space, and moreover that we may unconsciously contribute to the welfare or unhappiness of other worlds. At least, of this much we are assured, that pictures drawn by rays of light which never perish are continually originating from them and from us, in the midst of this ocean of interstellar ether in which we and they are voyaging alike.

Every illuminated body, as photography shows us, reflects its own picture ; and we see objects because these pictures are mirrored in our eyes. But, inasmuch as even lightning or an undulation of ether requires time to reach our globe, we see the sun rise eight minutes later than its real appearance ; and this luminous telegraphy takes about two hours to come hither from the planet Neptune, thirty-three years from the polar star, and no less than 500 to travel from the sun Alcyone. It follows that the minutest incidents of history and of our lives stand entered in this Book of Light, not one line in which can be tampered with



by any created being, and are incessantly being signalled through infinite space. But this is not all. Like our telegrams, these messages of light bring tidings, not of the present moment, but the past. Had the light of the polar star suffered eclipse thirty years ago, its rays, still on their way to us, would only cease to reach us three years hence.

Now let the picture be reversed, and it will remain no less indubitably true. As we behold the past in the stars, so their occupants behold *our* past. That unerring *Illustrated News*, the photograph of the earth and its inhabitants for the year 1877, has now arrived at 4 *Centauri*, but its flight thence to the polar star is still in progress, and will not end for seven years longer. Inhabitants of other worlds, of higher ranks of being and gifted with far higher senses than ours, may now be following the career of Martin Luther : spectators from many a star in the Galaxy may be witnessing the destruction of mankind by the Deluge, and Noah's disembarkation on Ararat : whilst to more remote observers the earth may still be shrouded in the "swaddling-bands of darkness."<sup>1</sup>

God has conferred this grand discovery of the community of worlds upon us at the precise moment when His creature, wearied with insoluble problems and doubts, had begun to question whether there existed any eternal principles of right and wrong, any fixed laws of truth or beauty at all. Enveloped in a genuine Scandanavian fog, Ibsen asks, "Who is to be our warrant that twice two makes four on Jupiter,

<sup>1</sup> Job xxxviii. 9. In order to consult any particular page in this volume of light, these higher powers need only approach or recede from us with sufficient swiftness ; in the one case, they read the more recent record, in the other, the more distant past. Indeed, this very change of station may not be requisite : for even our eyes are so constructed as to adjust themselves to things adjacent and remote, the microscope *and* the telescope.

or if goodness is still goodness there.”<sup>1</sup> If he had studied nature better, or were a clearer thinker, he would perceive that Jupiter would be no longer visible to our eyes, nor a globe flattened at the poles by rotation, nor influential by its powerful attraction on other planets—in short, would not obey any known law or exist at all to us, if the multiplication table were not in force there as well as here. And a sound philosophy would have taught him further, as it taught the ancients, that the fact that twice two makes four affirms by implication the idea of law and justice. But certain modern philosophers tell us that we cannot be sure that the standards which rule our ratiocinations have place in the divine nature. This objection strikes at the heart of Christianity, and, in its affirmative form, is atheistic. A Deity whose intuitions are in conflict with the immutable laws of logic implanted in my mind, has no real existence, as far as I am concerned. Infinitely as His self-manifestations surmount those of the human spirit, to predicate that both have nothing in common is an illegitimate inference. As the alphabet spelt out by the child contains in germ all the congruities and laws of language, all past and all future vocables; as in the ten digits which the scholar traces on his slate all mathematics, nay, all numerical relations that Newton, Laplace, or Legendre never dreamed of, are implicated; as the first octave that a little girl strums on the piano is the basis of the sublimest harmonies of Händel, Mozart or Bach: so those laws of thought, of which we study but the rudiments here, are fathomless emanations from a God who created man in His own image. That single declaration is, to the Christian, enough in itself to refute any philosophy that seeks to cast doubt upon the imperishable laws of right, truth and beauty.

There is another great message that light seems destined to convey to us. The four types of fixed stars, lately

<sup>1</sup> One of the pet difficulties also of J. S. Mill. (E.K.S.)

augmented to five, show increments of temperature, from the red to the incandescent hue respectively ; but, what is more remarkable, they give evidence of a steady convergence or decomposition of elements. The spectroscopic line of hydrogen, moreover, predominates so much on the hottest suns, that we cannot but ask with Lockyer whether all our elements would not be resolved into this primordial form of matter by a sufficient degree of heat.<sup>1</sup> These are lofty themes. If the chief discovery of the past century is the unity and conservation of energy, the no less important discovery of the unity of matter may perhaps be reserved for the next. It is true the long-sought art of transmuting metals, or of manufacturing gold and diamonds, is not thereby rendered feasible, since in all probability it will never be possible to generate except approximately the degrees of heat requisite for the decomposition of metals—such temperatures as are found, for instance, on the fixed stars. It cannot be supposed consistent with the divine purposes that man should be permitted to emancipate himself from those conditions of existence, whose removal would be fraught with capital changes in the development of the human race, the least momentous of which would be the almost total depreciation in value of precious metals and stones.<sup>2</sup>

<sup>1</sup> On the other hand, it is urged by Stas that the fact that the atomic weights of the other elements are not exact multiples of the unit hydrogen is adverse to this supposition. See Mendeléeff's *Chemistry* : II. 439 (note). (E.K.S.)

<sup>2</sup> " Human sagacity and activity will both increase as the world grows older ; but both the one and the other will find checks raised to humble them in their very extension. No man feels his impotence more than he who knows all the courses of the stars and yet feels that he cannot influence them in the least degree ; except it be the person who sees himself surrounded by agents which he can to some extent control, but which in a far higher degree control him, and disappoint by

The microscope has secured to us an equally sublime simplification of knowledge as regards the vegetable and animal creation. It has been the instrument of that surprising discovery that all the thousands of plants and mosses, with their roots and leaves, blossoms and fruits, are constructed alike upon the single model of the plant-cell. It is this microscopically minute sac of celluloid matter, its walls either thickened like those of the peach-stone, or, as in the pulp of the strawberry, of extraordinary thinness, that glistens in all shades of colour, according as it is filled merely with air, as in the lily and other white flowers, or with various-coloured liquids, or arrayed in the green of our grass and foliage when numberless green grains of chlorophyll swim in its colourless sap. It is this circular pouch that in the fructifying pollen wears the guise of a self-contained, graceful, spiny, polygonal globule, either assuming a hexagonal shape on transverse pressure, as in the pith of the elder-tree, or extending a cylindrical pedicle, and even undergoing transformation into elongated vessels and tubes through the re-absorption of its partition-walls. Pores or spots but lightly overlaid are formed in its "periplasts" to facilitate the absorption and transpiration of liquid aliment, and these dots coalesce into long spiral fissures, whilst the compressed walls turn to elegant lattices, stairs, and spirals, as we see in ferns and balsams. The cell, and nothing save

their unexpected movements his best laid schemes. The farther human knowledge penetrates, the more objects it discovers beyond its control, and moving on in their own independent sphere. The greater human activity becomes, it complicates the more the relations of society and the relations of man to the most capricious of the agents of nature; and the greater the power he exerts, he feels himself the more powerless in the grasp of a higher power. The wisdom of God is seen alike in what he has made fixed and what He has left free."—Dr. McCosh : *Method of the Divine Government*, p. 174.

(E.K.S.)



the cell, is the corner-stone on which the Almighty has constructed the world of plants, the mushroom no less than the palm, the rose, the moss and sea-algae, as well as the potato and the vine-cluster.

With no less simplicity of conformation the animal world is framed of millions of microscopic cells. Our hairs are cells, and so are those of the mouse and bat, of such exquisite delicacy beneath the microscope. Our heart and brain, our bones and our skin, are cells; and millions of cells flow as blood-corpuscles in our veins like the cells of pollen in the anthers of flowers. Just as matter is formed of atoms in millions, and the heavens of millions of stars, so we learn from the microscope that the water, air and soil of our earth is filled with billions of single cells, of whose existence man had no suspicion for ages; each of them a bud, an egg, a germ—a being therefore, not animal nor vegetable, yet endued with tremendous energies; pregnant with terrible miasmas, fatal to millions of fishes in the sea, and plants and insects on land; man too succumbing as grass bows before the sickle, should he be assailed by its legions in the form of plague, black death or cholera.

Mysterious and gruesome visitors! For such cells, charged with the millionth part of a drop, gender invisible seeds, or split, in many cases every hour, into two, four, eight or sixteen units, a fecundity unexampled elsewhere, as far as we know, in the sea or on land. They would destroy the world in a very few days, if other forces, equally unknown, did not arrest their propagation. What are plants, such as the poppy, which produce thirty million of their kind in the third year, or a fish, like the sturgeon, spawning three million eggs, in comparison with these vibrios, monads, bacteria, bacilli, and microbes, hundreds of millions of which germinate in a cubic millimeter, and which can generate sixteen and a half millions within twenty-four hours, two hundred and eighty-one billions in two, and forty-

seven trillions in three days by ceaseless multiplication ?<sup>1</sup>

Thus we find that the deeper we plunge into the gulfs of terrestrial matter on the one hand, and into the depths of the universe on the other, greater knowledge is invariably synonymous with unification and reduction to a few forces shapes and kinds of matter, nay to a single matter, force and shape ; and it is, philosophically, a significant fact that the creation culminates unmistakeably in a sublime unity.

It is by a more intimate acquaintance with the forces and laws of matter that those discoveries, the steam-engine, telegraph, telephone, etc., which amaze mankind, are made. Great inventions, doubtless, if our aims are great and good ; else no more than pretty toys, the instruments of our ambition, avarice or amusement. These and other discoveries not yet practically effected or become the common property of mankind—it may be guessed at, but not yet unravelled—are the features that will affix a stamp undreamed of by the popular mind on the next century of the world's history, and even on the outward life of the individual. Our enlarged physical conceptions have enabled us to construct the photophone, which reproduces the syllables uttered over a flame by reflection at a long distance, the telephone, microphone, and megaphone, the last an invention of Edison by which a conversation can be comfortably carried on at a space of two miles apart. Such kinds of apparatus tend in turn to the enlargement of our knowledge, and teach us how closely akin, and how wide-reaching the effects of sound, light and electricity are, how they reduplicate themselves where our senses cannot in the least track them, how tunes and sounds are mechanically representable in undulatory lines, and can be permanently registered ; so that in future days the grandchildren will

<sup>1</sup> But the scale is not infinite. These are the last vestiges of organic life, the lowest forms of which resolve themselves into mere straited geometrical figures.

be able to hear the tones of their long-deceased grandfather as often as they please, and thus the frozen notes of Münchhausen's hunting horn have become nothing more than a singular truth. It is a remarkable and important observation to the impartial thinker that *these modern extended theories of nature approximate more and more noticeably to those of the mystics*. That every gently spoken word is perceptible through the "ether" right across to the other side of the globe, and rebounds from thence to us, nay, reaches farther and farther through space; that the world is a mighty phonograph whence one day all words, lamentations, prayers and curses will resound anew;<sup>1</sup> that all life and labour on earth is the produce of stellar and especially solar influences, and that space and likewise the ether or true matter that fills it, is the reservoir or fountain of all forces;<sup>2</sup> that force is light and light force, and that force (material or moral) cannot be annihilated; that all mundane elements are derived from one pure element by an origination taking place on the stars; that all bodies radiate light and none are perfectly dark; that there are luminous rays, and in consequence also a vision that pierces the densest envelopes of metals themselves: these mystical dogmas are now, thanks to the progress of natural science, no longer perfectly preposterous, as they would have been a century ago, or conceptions laying a man under suspicion of being irresponsible. And the propositions, recognized by the deep insight of Boehme, that each star possesses a different nature, and different powers and properties (every star within the five great classes hitherto ascertained exhibits a different spectrum); that many stars are invisible; that

<sup>1</sup> "The air will one day give back all words to whose formation it has contributed."—Boehme.

<sup>2</sup> "The substantial presence-chamber of God is space," wrote a mystic, "replete with forces purely divine: wherefore the Bible terms it (Ps. cl. 1) 'the firmament of His power.'"

the inmost nature of a thing is discovered by fire ; and finally that number and numerical reciprocations lie at the root of material properties in general, have all been ratified.

(iv.) *Discovery and Civilization.*

Thus our civilization and intellectual life is likely to be more and more directed and furthered by an enlarged philosophy of nature, referring innumerable phenomena to a few fundamental ideas. Its clearest exhibitions are found not unfrequently in quarters where they are little suspected by most people. The modern demand for paper or iron is an instance. What would this century do without the former ? Paper is the passive abstract so highly revered by the Chinese, waiting for the revelation of the concrete !<sup>1</sup> Very slow was its journey from China hither ; in 650 A.D. it had reached Samarcand, Bagdad in 800 ; in 1100 A.D. Cairo ; but not till 1340 A.D. was the earliest paper-manufactory founded in France. The Chinese make paper out of bamboo filaments and the bark of trees ; so we are beginning to write on Tyrolese pines, French willows and silver poplars, besides *alfa*, a kind of African grass, and on straw. Why we employ so incalculably larger a quantity of it than our forefathers is not so evident. We certainly do not think more than they did ; but we think not so much for ourselves as for and with other people : instead of husbanding our cogitations until they overflow in a rare, but voluminous and leisurely communication, we prefer to splash them broad-cast on post-cards, of which we use one and a half thousand million yearly. We arrive at Naples and make the routine excursion to Capri. At once we dispatch a card home in this style : " Just seen blue grotto : marvellous ! Purest sky-blue and ultramarine ; but quite enough to break one's neck. Boat a swindle : *cinque lire*

<sup>1</sup> Germ. : Das geduldige Sein an sich, das der Offenbarung des Seins für sich harret.



per hour! Adieu! PS. Glorious weather. More to-morrow from Vesuvius!" Thus the impression is dissipated, the remembrance of it evaporates, and the meditated thorough description of the thing is never accomplished. The epistolary art is a thing of the past; post and letter-cards oust the genuine letter more and more; and a correspondence nowadays, such as was conducted by the leading men of the last century, has become a rarity. Books are likewise disappearing. *On ne lit plus de livres* is the lamentation of the Parisian bookseller. Light novellettes, illustrated family and comic papers, above all the ubiquitous newspaper, are supplanting them.<sup>1</sup> Educated people have ceased to collect libraries. All ideas are common property, to be picked up in the street. This has both its good and bad side. But the demand for paper is bound to mount yet higher in the next century; for it is gradually being converted to technical uses, as it has long been by the Japanese. The Americans manufacture paper railway-coach wheels, casks, vases, and racing-canoes; in Europe we find the dome of Greenwich Observatory, and that of the magnificent *Palais de Justice* at Brussels built both lightly and solidly of papier-maché, and the London County Council has authorized its employment for public buildings.

As a counterpart to paper, iron, or more strictly steel, which is now procured with equal cheapness direct from molten metal, gives us the necessary tenacity or backbone. We are living in an iron age. Once upon a time the knight shielded himself against hostile lances by means of sixty pounds of iron: at the present day (there is nothing new under the sun) we fortify ships and towers with millions

<sup>1</sup> Burke's remark on this head deserves to be quoted at the present day. "Newspapers," he says, "are a more important instrument than is generally imagined. Only suffer any person to tell us his story morning and evening but for one twelve-month; and he will become our master." (E.K.S.)

of pounds of steel by means of breastplates twenty inches thick, each of which weighs sixty thousand pounds, and costs £3,000, against shells of five hundred pounds weight discharged by cannon weighing forty tons. Moreover, we spin round the globe a network of iron wires, and steel rails over which thousands of iron horses snort day and night; whilst gigantic steel leviathans float on the waters of all oceans.

In earlier days the battle with fire and metal fascinated the mind of man. The smith was at all times a hero; and the first smith, Tubal Cain, was deified by the Romans. But what signifies the small consumption of former ages, compared with the furnaces of Krupp or Armstrong; or the primitive sledge-hammer in comparison with a giant steam-hammer of one hundred tons' weight, which shakes the ground for two and a half miles round, and the strokes of which cause houses at a distance to rattle and crack their walls; or the hydraulic presses of five million kilogram pressure, which silently compress, bend, or cut like so much dough, glowing-hot iron plates twenty feet in length and a foot in thickness. At Creuzot enormous cranes worked by electricity lift and carry up and down with ease cast-iron and blocks of steel of a weight of three hundred tons, and German labour has lately presented iron lock-gates to the Baltic canal, each wing of which weighs a hundred thousand hundredweight, or ten million pounds. This machinery combines with enormous weight and enormous horse-power the most delicate action. The vast steam-hammers will crack a hazel-nut without crushing it: thick trunks of steel are stretched on lathes to be turned till they shine like mirrors, and to be centred by Palmer's wheel to within the hundredth of a millimeter.

The output of metal is gigantic. Whilst in the last century a forge of twelve feet in height yielded from one to one and a half tons of cast-iron a day, a furnace

seventy-five feet high and correspondingly broad, now produces one hundred and twenty-five tons daily. This fiery orifice devours fifteen tons of ore and coke, and vomits every two hours ten tons of liquid metal in its stead. That goes on without a pause, day and night, alike on Sundays and holidays, for it cannot be put out so long as it lasts, that is to say, some fifteen years; then it is extinguished and broken up. Some great foundries now have as many as nine such smelting furnaces, which furnish a thousand tons of metal per diem.

Meanwhile, iron and steel, copper, zinc and aluminium, etc., these configurations of matter bearing so conspicuous a family-resemblance, descendants of one mighty, unknown radical, possibly the mysterious ethereal hydrogen, or the passionate, insatiable oxygen—for according to Professor Dewar, solid oxygen is subject to magnetic attraction—are yet merely implements or agents of unexplored energy. Iron, steel and metals in general are the tough and yet ductile, malleable, and supple embodiments of matter which are best adapted to be the vehicles of force or forces; and hence there could be no civilization without metals. From the first the intuitive foresight of the son of Lamech tamed them by the victorious agency of fire, wresting them from their integuments, compelling them to serve the will of man as vehicles of force.

Power, that is what we crave! what we cannot have too much of! We have certainly discovered how subservient and pliable, how interchangeable and easy to employ these forces are, or more correctly this Protean force is, which illuminates as light, glows as heat, flashes in lightning, sheds a beneficent warmth as sunshine, coaxing forth vegetation and ripening fruit, and is resonant in the organ-pipe and in the vibrating strings of the fiddle; which roars in the cataract, and invisibly as air itself, drives the giant cylinders of the screw-propeller, or in dusky grains

of dynamite or melinite or the shape of a yellowish oil, slumbers innocuous as though defunct, until by a spark, a small concussion, or mere friction, we let loose its fury, to annihilate our fellow-creatures and their works. Ever since we became acquainted with this tricky Ariel, at once a terrific master and a servant attentive and obedient to the slightest nod, he has won our hearts. There is no small town, hardly a village, that does not desire as much of this "power" as it can get, to light its streets, warm its houses, nay, plough its fields, reap and thresh its corn, and garner its harvest. For ox and horse grow too loitering and restive for the twentieth century. We want steel beasts of burden winged by lightning, indefatigable labourers, incapable of reasoning or choice, not in need of as much care and nursing as children, nor liable to sickness or superannuation, but which, should they get out of repair, are cast back into the furnace.

The steam-engine was of use as a link of transition betwixt the old, picturesque, clattering, moss-grown water-wheel and electricity; but in a short time it is likely to be thrown amongst the heaps of old iron, and the sooty, rattling locomotive beside it. Why should we bathe ourselves in perspiration heating dangerous boilers, trimming fires and building smoky chimneys a hundred feet high? Is not the world full of force? Wherever a brook descends or a river flows, or the wind blows across moorlands or bare mountain-peaks, or the sea rises and falls in alternate ebb and flow, there is force, which might be collected by turbines and windmills, screws or moveable plates, ascending and descending floats, etc., converted into electricity, and this force, stored in accumulators, might be packed and sent off, or allowed to flow like a stream through copper wire to a distance of sixty or possibly six hundred miles. Not only might a shoemaker in Basle sew on the soles of boots by means of the falls of the Rhine, but a farmer



might use them for ploughing at Constance at the same time, and a student at Zurich for lighting and heating his chamber. What ingenious and useful applications, or foolish misapplications, of this same force will not our children live to see, telegraphing, no doubt, their likeness across the ocean to a friend or bride, and taking with them on a journey in view of accidents a "two-horse power" in a pocket-case, so as to climb a mountain by a wire or to fly with the speed of the wind on electrical skates !

The next century will introduce us to the era of electricity. It is not enough to store up this all-pervading force, but a part must be drawn out and isolated from the ocean of electrical currents to be set in motion for our advantage. For a more complicated transmutation of force connects itself with electric lighting than with gas. If coal is heated in closed retorts, gas, ready-made except as regards purification, escapes through any orifice. In the case of electric lighting heat is produced by the consumption of coal, and this heat is then translated first into force, then into electricity, and finally into light. However, where water-power is to be had in the neighbourhood, this natural force thus converted into light will eventually rank as less expensive than coal brought from England or Saarbrücken for the manufacture of gas. It is not its handiness that is the chief excellence of electricity, but the fact that this cleanest and most immaterial of forces can be transported, carried, directed and consigned at pleasure, and be stored up in accumulators which are still susceptible of much improvement ; whilst smoke and soot are not only unpleasant waste-products, but occasion loss of power. In former times force was local, and difficult of removal, and men had to go in quest of its sources ; such forces resembled the intransmissible iron money of Sparta.<sup>1</sup> The

<sup>1</sup> νόμισμα δ' ἦν σιδηροῦν . . . βαρύσταθμον, δυσπαρακόμιστον. Plut. *Vit. Lys.* xvii.

gold coinage of force came into circulation with the advent of coal and steam. An easy means of exchange for sound, language, light, heat and motive-power has been lit upon in electricity. It is a currency like the bill of exchange or bank-note. All these can now be telegraphed to and fro, and we shall learn to manipulate them better still.

Thus much can be clearly seen. Electricity will achieve much in the future in three directions. First, as a practical, compliant agent, a domestic servant to everybody. Secondly, as the most convenient source of light and heat. Professor Haüssermann assures us that a heat ( $3000^{\circ}\text{C.}$ ) can be reached in an electric furnace which will easily melt quartz—hydrogen flame does not mount higher than  $1800^{\circ}\text{C.}$ —and produce carbides,—carborundum, possessing nearly adamantine hardness, or calcium carbide ( $\text{CaCO}_3$ ), a very important factor in the manufacture of alcohol and other things out of inorganic matter. Thirdly—and this will yield the most surprising results—electrolysis, i.e. the decomposition of elements by the negative and positive poles of the electric current, a discovery first made by Davy in 1807, will form a basis for electro-chemistry. It is on this singular property of the current that electro-metallurgy, or the art of coating in an electric bath any suitable bodies of whatsoever figure with the precious metals, depends, and by which the matrix can also be withdrawn, and the hollow solidly replaced. Still more important is the decomposition of certain bodies achieved by electrolysis, as in the production of calcium chloride ( $\text{CaCl}_2$ ), and in the separation of aluminium from loam. Lastly, it is by electrolysis that the marvellously rapid bleaching of wool, linen, wax, paper, and the cleansing by chemical analysis of the sewerage of large towns, the prompt tanning of leather, the equally speedy softening and ripening of fruit, the infusion of an old *bouquet* into new wine. and the artificial ageing of sound-boards for the construction of valuable

violins, is effected ! But probably one of its finest applications will consist in decomposing water into oxygen and hydrogen, and that so inexpensively that this decomposed water will form the *burning material of the future*, and an inexhaustible and most simple substitute for coal, which must, sooner or later, be used up. It ought not to be forgotten, however, here that "stored up sunbeams," as Stephenson, the talented inventor of railways, named coal, are changed into a source of heat and power by mere combustion, whilst water, being an internal combination, only becomes such by a resolvent force.

Thus electricity will be the cause of a marked acceleration of life, and play so indispensable a part in it that our grandchildren will wonder how their fathers could manage to exist without it. But it will render our posterity still more restless and hysterical, and life more spasmodic and agitated than at present.

Yet even the waterfall, the wind, and the tides are only derivative means of transmission and conveyance ; for we have seen already that all these forces are nothing but metamorphosed solar heat. The following example shows the magnitude of this source of caloric. When two pounds of carbon are burnt, sufficient force is set in motion to fling such a weight 230 miles high. That emblem of divinity, the sun, is the sole fountain of heat of which we are cognizant. Every square yard that it irradiates receives rich currents of caloric, and the whole earth incalculable quantities. As far as we know, all those beams beneath which the Sahara glows are lost, as well as all that make the roofs of Paris, London, and Berlin and the *piombi* of Venice so hot in summer. Were we acquainted with the art (which will be learnt) of turning all this warmth to account, we might literally heat our cities in winter with the overplus of summer heat, and at the same time render them cooler at the latter season. In

the same way, a small portion of the heat of Egypt would suffice as motive power for all the future railroads and ships in the valley of the Nile. Were we one day to flood the Sahara or Soudan systematically by means of sunlight, and fill it with abundance of springs, we should only be imitating on a petty scale what the sun does on a greater scale ; for he pumps *daily* four million tons of water many thousand feet high from the Dead Sea alone. But then the bright rays which lighten and warm us, ripen corn and fruit also, and paint the flowers : they are rays of potency indeed ! The quota of solar force which this small globe appropriates, but a tiny fragment of the total efflux that streams out into space, amounts in a year to more than two hundred and seventeen millions of millions of horse-power. These rays produce many million times vaster effects than all our machinery combined, by their immediate influence on vegetation alone. It will be the ideal of the engineering of the future to draw directly from this primal source of power, and to convert, for example, in the Sahara, insolation into electricity, for the equipment of electric railways and so on. Thus we shall resort more and more to the central fount of energy ; and this may not improbably occasion a steady re-migration of mankind towards the lands most favoured with sunlight, Egypt, Assyria, Palestine, Mesopotamia and Carthage, the quondam inhabitants of which stood at the head of the human race in former days.

### III.—A FORECAST OF THE FUTURE MATERIALLY VIEWED

The seeds of the future lie in the present.<sup>1</sup> Observing the logical outcome of these germs, and setting on one side both Biblical prophecy and the future influence and solution of "our social problems," we shall be in a position

<sup>1</sup> "In dem Heute wandelt schon das Morgen."—Schiller.  
(E.K.S.)



to sketch more or less correctly an approximate picture of the *material* development of the world during the next century.

In the first place, then, general intercourse will reach a height unanticipated to-day. Broad-gauged electric railroads will be built, on which, instead of the steam, soot and noise of rattling trains, palatial carriages will glide off one by one every ten minutes or so noiselessly, and, thanks to greater elevation combined with wider gauge, will not be derailed by a speed of 90 to 120 miles per hour. They will be worked on a "zone system," such as Dr. Perrot projects, permitting of a journey throughout the whole of Germany, for instance, for a single mark. In place of those toy railways which we use, congratulating ourselves on a comfortable journey cooped in mere sheep-pens, where we have hardly room to stretch our legs, trunk-lines from Scotland to Ceylon, London to Peking and St. Petersburg to Cape Town, will be established with gauges of 30 feet and multiple lines (to obviate derailment) admitting of tremendous rates of speed. Hotels furnished with every convenience will travel to and fro on these lines, and in the middle or attached at the rear the travelling villa of the future. Constructed of aluminium-bronze, "*ixium*,"<sup>1</sup> or possibly *papier-maché*, with hot and cold widths of celluloid wall-padding, and a pretty garden and arbour on their terraced roof, the interior sumptuously appointed and of course electrically lighted and heated, and provided with refrigerators against tropical climates, these villas, delivered to order within a week by noted firms for £500 to £700, will afford to the public, the engineer and the travelling business-man facilities of transportation with their families to any point of the globe, without obliging the lady to rise from her

<sup>1</sup> This is a fancy name for a "metal of the future," hard and elastic, like steel, yet not liable to rust.

seat in the bow-window, or her husband from his writing-desk. Arrived at the middle slopes of Quilimanjaro<sup>1</sup> or, the sea-coast of Ceylon, the villa will be detached, carried to a picturesque site, and after residence there as long as may be convenient, re-consigned to Berlin or Paris for the season. It goes without saying, that it can be transported again with its belongings by transatlantic steamer to the polar icebergs, or take a passage for a brief summer sojourn during the whaling season to antartic latitudes.

But besides these yet more massive lines, equipped with huge dépôts, wagons and tanks for corn, oil, wine, petroleum, etc., and storage of a thousand cubic yards content, will serve for international trade. Commodities, moreover, which are not perishable, such as iron-ore, timber, blocks of granite and porphyry, will avail themselves by many routes of the cheapest of all motive-powers, the wind. On sea as well as land these great routes will be more and more sharply defined, and ocean "streets" will come into use between London and Cape Town, Bordeaux and Panama, Liverpool and New York, illuminated by floating steel lighthouses, anchored at fifty miles' distance apart, which will distinguish the course of outgoing and incoming first-class vessels, by a white light on one hand and red on the other; whilst the smaller fry will be obliged to keep to either side of the high-roads as the sole expedient for avoiding collisions. These lighthouses will serve at once for reserve-stores, news-bureaux and salvage stations. Besides voyaging palaces and gigantic cargo-boats, plying regularly, storm-proof, for the transport of the products of one continent to another, the seas will be furrowed more and more by elegant yachts, which, in imitation of the floating water-beetle (*dytiscus*), will either unfurl their airy wings and dance lightly on the surface, or, in order to investigate the wonders of the deep or avoid a gathering

<sup>1</sup> A mountain 19,700 feet high in German East Africa.

storm, furl sail, stoop the masts, and sink, water-tight, to the bottom, there to creep on their way out of sight. Moreover, they will be able, by means of dynamos, mounting on land, to adapt themselves to the iron-roads, scour the country by the aid of wind or electricity, and conclude their tour by competing in races on the ice-banks of the North or South Pole! What a change from the conditions of locomotion in 1669, when no post-chaise was permitted to travel in England more often than once a week, nor to cover more than thirty miles a day!<sup>1</sup>

We need not dilate upon the elevators which will be found on all mountains, by means of which one may ride smoothly upward on an electric cable, seated in the most elegant of "air-cars"; or the "deep-cars," for the purpose of exploring the copper mine (3000 ft. deep) of Falun<sup>2</sup> and the salt-mountain of Wieliczka,<sup>3</sup> or the crater of Mauna Loa,<sup>4</sup> provided for this last excursion with asbestos carriages.

It is also to be hoped that by degrees, in common with this vast expansion of intercommunication, a thing in itself unproductive, a systematic tillage of the soil will be undertaken in fulfilment of the divine injunction to "subdue the earth." For all systems and theories of political economy cannot reverse the fact that man does not live ultimately, and never has lived, on coal, steel, or plate-glass, nor on wages, or art or industries; he must have corn, wine, oil, meat and milk for his food, wool and cotton, flax, hemp and leather for his clothing; and therefore agriculture, cattle-breeding and fishing inevitably deter-

<sup>1</sup> Cf. the third chapter in Macaulay's History.

<sup>2</sup> A town in Sweden.

<sup>3</sup> The largest salt-mines in the world, in the vicinity of Cracow, in Galicia. There are entire villages underground in these enormous salt-beds.

<sup>4</sup> A volcano in Hawaii. (E.K.S.)

mine the permanent condition of the race. It would be a grand step if, instead of a "federation of the world," the nations would conclude a fifty years' armistice. Then the millions of lusty striplings who are incessantly drilling for the noble and costly game of war, might make themselves useful, as, to some extent at least, the old Roman soldiers did. First of all, they might disinfect Mesopotamia of fever by planting a few million eucalyptus trees there, then dig canals according to the admirable project of the ancients, and lastly build two or three capitals and some dozens of other towns, so as to restore the land to its former dignity, that of being one of the granaries and gardens of the world. It might be colonized at the cost of government, by international agreement, with hundreds of thousands of the unemployed and often embittered class of men who swarm in our European states, and can find no place for themselves beneath the sky. That accomplished, these regiments might proceed to the reconstruction of Carthage and the re-settlement of North Africa, formerly so fertile. A million more immigrants might settle here. The irrigation of the Sahara by artesian wells and plantation of date-palms might come next. A sack of this nutritious and wholesome fruit would then be cheaper than a sack of potatoes. Lastly, there would remain the clearing of the larger part of South America, the erection of aqueducts and railroads through the boundless forests between the Orinoco and the Amazon, and the cultivation of the *pampas* by means of electrical ploughs and sowing and reaping-machines. After that, the menace of overpopulation would be disposed of for some centuries; indeed, it has been reckoned that the earth, if exhaustively tilled, would afford elbow-room and sustenance for forty times the number of human beings that it now houses. In conclusion, some thousands of millions of fruit-trees of the most various sorts, might be planted for



ornamentation and the use of man on islands and heaths, prairies, steppes and mountain declivities, from the cocoa-palm and banana to the pear and the vine. Besides, these soldiers, instead of being maintained at a sheer loss, as they are now, might excavate several useful canals, above all that of Panama ; in view of the completion of which that point of intersection may become the magazine of the world for the general products of the four continents, a mart of speculation and mammon, of greed and material acquisition ; the moral antipodes of Jerusalem, the true centre of the globe. Canals shortening the distance from Bordeaux to Marseilles, from Trieste and Venice to Genoa, and from Leith to Glasgow would also be contributions to the general welfare ; and similar means of transit would be of service between the Baltic and the Black Sea and between the latter and the Caspian, and from the Black Sea to the Persian Gulf. Paris, Berlin and Rome, like London, would become great ports, protected against hostile attack by steel bastions. Finally, several gigantic viaducts might be systematically constructed of ixium, the metal of the future. First, as already mooted, from France to England, on arches of a span of thirty thousand feet, with pillars five hundred feet high ; like the towers of Cologne Cathedral, only that steel cables drawn through openings in the blocks of steel would replace mortar and cement. Next, one from Italy to Sicily, and a bold and graceful viaduct shaped somewhat like a bow, connecting the shores of the Bosphorus ; and others from Ceylon to India and Gibraltar to Morocco. If there are obstacles in the way of the above method of achieving these enterprises, some of them might be carried out by joint-stock companies, offering the prospect of large dividends to their shareholders.

But whether they are carried out or not, one thing is certain ; the principle of association will produce the most surprising results, second only to those arising from the

development of intercommunication ; for we have scarcely begun to comprehend what the concentration of the influence and will of ten thousand men in the form of capital can effect. The city of the future will carry this principle even into private life. With an increasing degree of uniformity it will tend to become one stately block of houses, built upon a common plan and with common police and sanitary arrangements. Symmetrical edifices of twenty-five or thirty stories will be connected by ornamental pontoons and fire-escapes, and showy gardens will be cultivated on their terraced roofs, with alcoves and fountains as well ; and it will become the fashion to give and receive calls here at a height of some three hundred feet above the street beneath, itself monopolized by business, and defended throughout by glass against rain and snow. Probably entire towns—let us suppose, on the “ Euphrates railway ”—will consist of a single block of houses five hundred feet high and three thousand feet long, canopied by a monstrous glass cupola, the glittering, gilded copper pinnacles of which will serve to conduct the electricity of the air and of thunderstorms to enormous accumulators of one hundred thousand horse-power, forming the heart for the distribution of light, heat and force through the whole structure.

And in contrast with this solid manufacturing centre, the artistic residential town, buried in foliage and flowers, built of bronze and glass, will arise as a centre of pleasure ; indeed, the two types may be seen already in Chicago and Arcachon respectively. The ideal of the modern town, with its drainage system, the circulation of its water and gas pipes, and its nexus of electrical nerves diffusing force universally from a central point, approaches more and more nearly the structure of the human body. The future will carry these prognostications much further. A hundred years ago or less the first railroads were an object

of jest, scorned as reckless crazy schemes, not to be taken seriously; decidedly dangerous, especially to field crops! These lines ought to be enclosed by law behind lofty hoardings! The same cry repeated itself when the first steamers appeared. Even sixty years back there was still a notion that they might be of use on rivers and lakes, but not on the open sea—out of the question between Europe and America! For, not alone in reference to things divine, but in every department, man is a creature of little faith.

The consequences of combination will make themselves felt also in the home and daily life; for instance, in the abolition of private kitchens. People will fail to understand in the year 2000 how there was a time when in a town of a hundred thousand inhabitants ten thousand maid-servants were in the habit of using ten thousand lucifer matches at least every day to kindle with much trouble as many fires on ten thousand hearths, a proceeding occasioning an enormous loss of capital in outlays on kitchens and kitchen spaces, fuel, maintenance and wages of cooks, simply in order to cook to the accompaniment of noise, soot, disagreeable smells, washing up, ashes and refuse of all kinds, what two hundred cooks at most in one large central culinary institute might manage, especially with electrical quick-cooking ranges, not only more systematically and expeditiously, but better and, above all, far less expensively, for the whole town; as may be seen even at present on an ironclad with a crew of seven hundred men, or in some "people's kitchen."

Our defective grates, moreover, with the smoke, soot and smell and the coal-dust which they leave behind them, represent only the rudimentary stage of heating appliances. Handsome, opaque glass globes, veritable "suns of the dwelling house," in which, as already remarked, water decomposed by electricity will be the fuel, perfectly clean and set going and regulated by mere pressure of a button,

will come into vogue before long; and chimneys and chimney-sweeping be remarked with a shudder by our posterity (in picture-books) as hideous concomitants of "the semi-barbarous nineteenth century."

An inevitable sequel of the enormous intercourse and multiplex combination characteristic of the future will be a wide-spread assimilation of feeling and thinking amongst all nations. Identical customs and philosophies and arts, the same systems of justice and religion, good and bad alike, will increasingly become the patrimony of the entire race. Moral frontier lines and barriers will collapse, and cosmopolitanism become the accepted creed of the educated classes, the nations forming one great family, though alas! a family of kinsmen still at feud. The ruling powers, Germany and England, France and Russia, will enlarge their moral as well as geographical boundaries, and perforce seek a vent for their active expansion in colonization. At the same time, the five hundred millions of the yellow race, a third part of the whole, will probably pour through the Nicaraguan Canal as by an open sluice into the Atlantic, flooding the adjacent continents, and, it may be, over-running South America without experiencing much resistance. This wave of migration also will conjure up new pretexts of dissension, and in Africa, if not in Europe, the interests of Germany and France, and in Asia those of England, Russia and Japan will come into collision. A marked feature of the future will be the common feeling for common interests diffused by a universal press, and thus will the way be paved for the last decisive internecine conflicts of mankind *en masse* for universal empire, and against their Maker. Meanwhile, the Gospel "will be preached to all creatures."

It is also inevitable that all languages should lose their angularities,<sup>1</sup> modify and interpenetrate one another and,

<sup>1</sup> Germ. sich abschleifen.



like men, gain in explicitness and breadth, but forfeit their individuality and character. They will be simplified as regards grammar and orthography, and thereby impoverished and stereotyped; yet their metaphorical funds will be amplified. Hundreds of terms not yet coined, names of new means of intercourse, appliances, apparatus, weapons, garments, animals, plants and foods will become just as current as "landau," "cognac," "bamboo," "carnival," "sherry," "gutta-percha," or "tapioca" are now in English.<sup>1</sup> Tourists in the future will probably speak a language of their own, lamentably similar to an Italian *pot-pourri* of modern date, the substratum of which, as the most practical of tongues, will possibly be English, the easiest to learn, if purged of its irregular verbs and a few other inconveniences. No doubt an abbreviation of our circuitous phraseology, and no inconsiderable economy of time and strength thereby, will be effected. Such terms as "cosmopolitanism," "spectrum analysis," and "electricity," are of course a positive disgrace to the nineteenth century! Why not substitute "el" for "electricity," and speak of "ellysis" and "elcurrent," just as the matter-of-fact Londoner clips "omnibus" into "bus," and "Zoological Gardens" into "the Zoo"? To dream of a general *lingua franca* or "Volapük," however, is sheer nonsense, and very questionable poetry. Never will the Esquimo, or Greenlander have any occasion for such words as "elephant," "palm," "banana," "palanquin," "mosque," nor, *vice versâ* the inhabitant of the Sahara familiarize himself with "cajak," "seal," "whale," "penguin," etc. For analogous reasons one language can never be at once intelligible both to the son of the Alps

<sup>1</sup> "Landau" and "cognac" hail from Germany and France respectively, "bamboo" and "gutta-percha" from Malaysia, "carnovale" is Italian, "sherry" from the Spanish Xeres, and we owe "tapioca" to Brazil. (E.K.S.)

and the Bedouin, the Icelandic fisherman and the Swabian peasant. For international commerce a stenography common to all civilized peoples will, no doubt, be indispensable. When we bear in mind that the generality of business men and traders do not require more than six hundred phrases for their entire correspondence, it is obvious how easily these could be reduced to universal signs, just as the Arabic numerals are current throughout the world. The same token would denote the verb *send*, *versenden*, *expédier*, and *mandare*, and a second *goods*, *Ware*, *marchandise*, and so on. Once make a beginning in the employment of such marks, and a name would spontaneously arise for each, and a language of commerce, though of restricted compass, quickly grow up.

The school of the future will unquestionably be adapted to suit the advance of mechanical expedients. The principal, seated in the centre, will be able to observe from his armchair by a glance at the wall what seats in the whole building are unoccupied, and to satisfy himself whether any pupil in this or that form is standing up to answer a question, and, when he pleases, to hear every word of the lesson and every answer given through a telephone, and to scrutinize every boy in a *camera obscura* as he sits in front of his "stenographic" machine; and every word of the lesson will be registered by a phonograph so that a superintendent may be cognizant at any time not only what answers are made, but even of the tone in which they are spoken. But it is more significant that this school-to-be will part company with our traditional methods of instruction *in toto*. It may remain a moot point whether, as Renan supposes, nobody will any longer study universal history fifty years hence; but so much may be asserted with confidence: the future school will no longer base the knowledge and capacities of modern man on the capabilities of nations long extinct, but on the opinions and

demands of the present. We accoutre our youths at public schools and universities in handsome coats of mail, a helmet with waving plumes, an antique corslet and two-handed blade, which are very excellent for mental gymnastics or examinations, and may be a suitable equipment for a permanent, pensioned government situation : but in other walks of life every infantry-soldier brings down our *preux chevaliers* at twelve hundred yards, without fail, with his repeating rifle ! It will never enter their heads to drill their scholars in all the great events of history, all that the wise and sagacious of all ages have said and thought, or that “ scientifically educated ” masters should inculcate the characteristic opinions of former generations concerning man and the world in authenticated formulae of thought, speech or book, in order to educate, grace and guide their minds and lives ! The pupil entering his teens, already self-sufficient and prepared to choose his own companions, will remind his instructors that they have to hand over to him practical, serviceable weapons for the battle of existence in return for their fees—facts, that is, data, numbers ; primarily, the laws of mathematics and nature, then a couple of languages of general currency, thirdly a little sociology ; and all this in a terse and clear form, by questions and answers preferentially, a certain quantity of which he can imbibe every day. Only nothing intellectual ! For the world is not intellectual. “ I can make no use of mind, and have one of my own ; so do not require yours. Much obliged for offers of theories, systems, views, speculations, conclusions ; can make these myself ; also sentences and exercises in prose ; when I have an idea I will find a word for it ! It is a matter of utter indifference to me what the Greeks and Romans, Scythians and Chinese, thought of the world or its Author, or what occurred to them, compared with what *I* think, and how *I* succeed. Then off with them ! I want to be able to build, as I

please, in the shortest possible space railroads or houses, to invent or improve machines or workable apparatus, to command a vessel, or a regiment, to conduct a factory, a bank or house of business, or to colonize a country and be a large sheep-breeder or smack-owner. I need no ideals or philosophies, but power, marketable dexterity, concrete knowledge. That I must make my own by five hours' work *per diem*, for I must have my "sports" as well. The charge of my character and affections is my business, and my religion ditto."

Social life, too, will wear a different face from its present aspect. We may forecast—for examples occur already in America—that many "emancipated" women, swayed by yet more "emancipated" children, will regard themselves as justified in treating their money-making husbands who lock their heart and treasure every night in the same fire-proof safe, and bring home sovereigns, no doubt, but not a single, true or interesting idea, with corresponding acerbity and coldness. In those hours which are left free to them from their hotel-life and "public nurseries," they will devote themselves to "light literature." The perusal of the illustrated general, family or fashion paper, which will form almost the sole reading of the future, or the indolent railway and family novel, with the piquant "extra-special" of sensational revelations, will be their unique delectation. For the business man will be too much engrossed by his affairs, indeed, too much blunted in his sensibilities by incessant money-transactions, to be able to do anything except enjoy reading (or writing) a financial paper. The lady will more and more arrogate to herself the control of "amusements in aid of benevolent objects;"<sup>1</sup> the supervision of cooking institutes, administration of hospitals, orphanages and infirmaries, the management of schools and domestic and municipal govern-

<sup>1</sup> Germ. Wohlthätigkeitssport.



ment, vigilance committees, the supervision of social and club-life, etc., and thus mount step by step to the lecturer's rostrum and the pulpit. Thrice enviable posterity!

#### IV.—A DARK BACKGROUND

Nevertheless, we could point out many dark shadows in this picture of a coming generation. We are very proud of our steam and electricity; yet they have done us damage. Ever since we have economized so much time by their aid, thanks to the telegraph and telephone, we have had no leisure whatever; ever since we "vanquished space and time," our lives have been growing shorter instead of longer. Our grandmothers—and here I speak from personal recollection—baked their own bread, and themselves spun their linen, embroidered their own sofa-cushions and table-covers from a pattern of their own design or from flowers fetched out of their own gardens, and had time nevertheless to read solid, bulky volumes along with their daughters. Many a lady of the present day scarcely contrives to get through one illustrated or fashion paper. Electricity will make our children still more restless, volatile, and nervous; and yet tranquillity of spirit is the only soil in which divine seed will germinate. Unhappily, as a fruit of this unrest, the use of stimulants and narcotics, of alcohol, opium and morphia will advance by leaps and bounds, accompanied by that mental and moral intemperance which has the same symptoms and consequences. A constant, ever-growing demand for a new stimulus, at once an excitement and incitement, and at ever lessening intervals (the newspapers of the future will probably appear once an hour with supplementary pages inserted), ever stronger and more pungent doses, productive of a state of tension, ever augmenting reaction after the indulgence, and an ever greater infirmity of the mental nerves and paralysis of the power of thinking: these are the portents already

visible of the effect of perturbing mental intoxicants. Even Christians follow suit and live in a whirl of unions and committee meetings, conferences, lectures, missionary gatherings, pious tea-drinkings, and choir practices, reading, too, endless magazines (Union, Missionary, Young People's, Church, School, Pulpit, Family and Denominational Chronicles) and writing for them ; and as far as noble resolves, and good actions are concerned, exhaust themselves in anniversary addresses and the like. To a few all this feverish activity may be appointed ; but in most cases we are reminded of the Greek adage—" Zeus frowns upon the over-busy ! " It is a law of nature still unrepealed that trees do not mature fruit without any intermission ; they rest all through the winter ; and most of the orchard-trees at the Azores, where there is a perpetual spring, perish of exhaustion in consequence of an uninterrupted spell of growth.

In general, we cannot discover what unqualified benefit the vast acceleration and increased facilities as regards travelling have brought us. International trade flourished in the days of the Phœnicians and of Carthage, and the merchants of Ulm and Nuremberg grew rich, though they had to fetch their wares from Venice and Genoa on pack saddles by a week's peregrination across the Alps. The sense of motion, doubtless, has a peculiar charm for man, and as he is carried past a diversified landscape in an express, he fancies that he has been doing a great deal. Yet has not every one observed how the passengers in a fast train chafe and growl when it is twenty minutes late, and how an hour after their arrival they saunter about yawning and ask whether there is nothing going on ? We cannot quite comprehend why people are so desperately eager to exchange one state of discomfort for another, and are irresistibly reminded of Pascal's remark that all the wretchedness of man springs from his not knowing how to keep in his

place.<sup>1</sup> The saying of Madame de Stael, "*en voyage on ne trouve que ce qu'on apporte*" is unquestionably true. Certainly, the modern globe-trotter is the most ignominious of all personalities!

There is no question that the enormous development of travelling tends to the ruin of individuality. To a strong intellect, intercourse with many fresh minds, and familiarization with new circumstances, customs, and usages is a healthy and beneficial process. For it recognizes under mutations of form the same eternal, ubiquitous laws. The weak, however, are bewildered, and their routine of thought is disturbed; their superficial faith is staggered as soon as they hear contrary opinions expressed; and, ever changing their creed, they come to regard the world at last as a huge fair, the stock-in-trade of which is a deception and imposture, and in any case the bulk of it a mere subject of private taste.

We cannot violate the concords of nature with impunity. One of these is the correlation of time and space in relation to human thought. The normal rate of man's "conquest of space" is the speed of a foot-passenger, or one step a second, just as that of the snail is a millimeter. The pedestrian under ordinary circumstances finds that he has acquired the largest amount of sensible impressions by that mode of locomotion; in other words, he has been travelling in a just synchronism with space. A quicker

<sup>1</sup> "J'ai souvent dit que tout le malheur des hommes vient de ne savoir pas se tenir en repos dans une chambre."—*Pensées* I. Art. VII. But even the volatile temperament here censured is nothing new or exclusively modern. Lucretius, for example, draws an exactly parallel picture:—

"Currit agens mannos ad villam praecipitanter,  
Auxilium tectis quasi ferre ardentibus instans;—  
Oscitat extemplo tetigit cum limina villae."—III. 1063-5.  
(E.K.S.)

rate of motion may be agreeable in itself, but the mind does not then exhaust the space traversed. For this reason, whilst steam and electricity are not evil, any more than gunpowder or the manufacture of steel, yet we are mentally too feeble to use them to advantage. Fallen man does not and cannot appreciate these forces of nature commensurately : his state is analogous to that of a child presented with a bank note for £50, who innocently cuts out the numerals to paste them in his scrap-book. So long as he regards these forces merely as useful tools for making money—and all his industrial and business enterprise has no other aim—they do him more harm than good. Hereafter, promoted to a higher platform on the new earth, man will be no longer dependent on these forces, for they will be innate in him ; there he will be himself a focus of energy, and “ shine as the sun,” counteract gravitation, fly with lightning speed hither and thither, and be at once light and force, both thunderbolt and thunder.

Yet the advantages of the principle of combination must not blind us to its defects. Strictly speaking, nothing is gained thereby : a note for £50 is not a whit more than twelve thousand copper pence. On the contrary, the working of this system must entail a diminution of force. Trees thickly crowded together afford each other protection, but do not expand so freely as solitary specimens. When a dozen individuals are merged in a committee or directorate, it is undeniable that their resolutions do not become twelve times wiser, nor their acts twelve times more decisive. The energies of the individual members are so crippled and neutralized, as a rule, that less is accomplished by their policy than if a single energetic and far-sighted man had taken the business in hand. Therefore it is that a strong personality, such as that of Luther, does not usually emerge from any species of association, but instinctively avoids it, whilst feeble characters endeavour



to screen themselves behind such bodies. From the model society everybody expects addresses, nobody anticipates deeds. No person takes fully and fairly on his own shoulders the blessing or malediction of his word or act ; at any rate he shares it with his party ; and a cursory inspection of the sittings of Parliament, the meeting of synods and congresses, and the sessions of commissions and committees of all sorts, will show us what interminable, colourless, marrowless, futile harangues that implies, and how painfully interpolated, truncated and pointless are the resolutions finally adopted.

The same fact meets us in every-day life. A modern ocean steamer is a triumph of combination. But the saloon passenger and possible shareholder who is taken on board as a valuable piece of cargo to be delivered in good condition at such and such a port-of-call, has nothing to say in the affair, and is conveyed along with the vessel, deriving from this sumptuous aggregation of conveniences merely an enervating taste for luxury. Far more concern in the matter has the solitary Englishman or Norwegian who boldly crosses the ocean alone, by his own efforts, or with a couple of friends, in a boat of his own rigging ; and consequently he is admired on all hands ; but the mere passenger gets no applause. When a sportsman in Africa kills a wild elephant at a hundred yards with his modern rifle and patent shot, his piece is not his manufacture, but the outcome of the thought and labour of hundreds of other people. And so the great hunter Baker Pasha felt like a small boy in the presence of a negro tribe, the members of which beard the lion in his den in parties of two or three with swords of their own forging, and lay him low in single combat. Let us reverse the picture. Who would know better how to conduct himself on a desert island like Robinson Crusoe's—the Norwegian fisherman from some lonely *fiord*, or the highly cultured chairman of a geographical society

backed by his whole committee? Dr. Kane, blockaded with an exhausted crew by polar ice on board a vessel most scrupulously and scientifically fitted out, was astonished to hear his young Esquimo pilot declare his intention of braving polar nights, snowstorms, ice-drifts, and bears, in order to return to his tribe at a distance of a hundred miles away. And he cheerfully marched off, and—what is more—reached home safe and sound!

Upon this system the individual abdicates his liberty and even responsibility in favour of the corporation, surrendering his independence, activity, and self-confidence. Estimated fairly, the sum-total of results, imposing and extensive as it may be, yet amounts to less than that of the individuals taken apart. History teaches a similar lesson. Compare the results achieved by the mediæval Italian republics with modern centralized governments. Where have we a city like the Venice of yore, queen of the Mediterranean, antagonist of Turkey, “holding the gorgeous East in fee”;<sup>1</sup> or Florence, battling single-handed with pope and emperor; or the Hanse Towns which engaged Denmark and Sweden; or one to vie with Nuremberg in strength and self-reliance? The language of certain new authors, such as Ibsen, who contend that none are strong but the man who stands alone, is a natural reaction from the mania in favour of association. But this rebound overleaps itself. Conceding the abstract possibility of a man’s casting off all supports, he would turn out a miserable, denuded, crabbed egotist. Luther, Bismarck and other leaders of men grew strong, not by a process of isolation, but because they thought and acted in concert with and on behalf of millions. It is well to recognize that modern associations are not an organic or hierarchic framework, but the very contrary.

<sup>1</sup> Wordsworth: *Sonnet on the Extinction of the Venetian Republic*.

Still more clearly apparent are its mischievous effects in the apportionment and partition of work in manufactories, and, more or less, in all kinds of industries, in contradistinction to the individualism of agriculture. The ideal manufactory is one in which a single workman reproduces only one and the same movement all day long ; for thus the largest total of uniform products is obtained. But this too is directly repugnant to nature, which exacts from every organism or vital unit the discharge of all vital functions in and for itself. The foregoing endeavour to turn human beings into confined specialists secures certain practical results, as may be seen in scientific circles ; but it acts prejudicially on the mind, and affords an illustration of the antagonism that exists between mind and matter. This is the reason why the division of labour, amongst its other fruits, has engendered the most extreme forms of socialism. A man feels on the one hand that he is not set in this world in order to move a lever two thousand times a day ; and on the other, the very reduction of a human being to a machine deadens the sense and sensibility of the mind ; matter reacts upon it, and, almost inevitably, the mechanic espouses the creed that the world is a machine compounded of matter and force ; indeed, the more searching his reflections, the sooner does he arrive at this conclusion.

It is an unmistakeable fact that the conflicts between poor and rich are not mitigated, as many people predicted, by the diffusion of this principle of combination, but rather accentuated. We now have the homeless, penniless vagrant, but we have the millionaire as well. It is to be feared that in the future money will play an even greater part in life than at present. Yet nothing hebetates a man so surely as constant money transactions. America has given us, amongst others, an example of two financiers who, starting with nothing, left several millions behind them, and in

spite of all their shrewdness in accumulating pelf remained mentally as narrow and absolutely heartless as ever, and so uneducated that one of them never learnt how to write a sentence without a blunder. We do not know what the further results of the "ring" may be; it can hardly be interfered with by law: there seems no reason why some Bremer or Manchester plutocrats should not engross the tobacco crop in Porto Rico, and sell it again at any price they choose. Boycotting, however, will exhibit its fairest blossoms in that day when no man may "buy or sell, save he that hath the mark of the name of the Beast, or the number of the name." <sup>1</sup>

Moreover, the machine, that outcome of the thought of many men, that mental petrification, like all terrestrial injustice, takes its revenge. The Egyptians, Assyrians, and Babylonians well knew what they were about when they wrought their great works with the aid of hundreds of thousands of slaves. They, too, might have invented machinery; at least, they did plan the great irrigation works for their hanging gardens, and the Egyptian priests caused their brazen temple gates to open by steam power, when the flame on the altar was kindled: but they employed living force for the building and erection of their temples, statues, sphinxes, and obelisks, and would have deemed it a profanation to produce a thousand copies of a statue of the gods, factory-wise, by machinery. We honour combination; they paid homage to individualities. We have said, however, that machinery has its revenge. It is a minor consideration that from time to time it flings (with keen satisfaction) its contriver, man, against walls, till blood and brain spurt out, or, as if possessed by a sudden paroxysm of fury, seizes, crushes and tears him limb from limb. Much more sinister is the enfeeblement of the race

<sup>1</sup> Rev. xiii. 17.



occasioned by this triumph of mechanism. The measure of mind that the inventor puts into an engine, petrifying there, becomes lost to the community and to the workman who uses the instrument. The galley-slave won a better recompense from his superhuman exertions and laborious tussle with wind and tide than the machinist, superintending an engine all day long, who only moves a lever or lubricates it from time to time. The typewriter is a serviceable invention; but the man who avails himself of it suffers a mental loss, instead of acquiring a characteristic handwriting corresponding to his idiosyncrasy; and the same thing happens to the person who performs astronomical or algebraical computations with the marvellous calculating machine of Babbage, or fabricates one thousand yards of photographs, the equivalent of 40,000 cabinet photographs, per diem, by means of the new rotatory machine and electric light, instead of making one painstaking sketch from nature. Mechanical photography is displacing the beautiful skilled art of engraving. The telegraph, telephone and phonograph tend to a mechanization of language. We boast that we have conquered time and space; but they conquer us, for it is *they* who are invincible.

Lastly, we are proud of our advances in general comfort, in the conveniences and luxury of modern life in contrast with that of our forefathers. Here is another instance of characteristic hypocrisy! We teach our children with the utmost gravity how Hannibal's soldiers forfeited their prowess and invincibility by a single Capuan winter, how the youth of Persia and Lacedaemon grew to be heroic by a process of physical hardening; and then scold them for standing in the open air without a scarf on, or in the sun bareheaded, and take pains to bring them up as effeminately as we can. The burden of our historical courses is that as soon as the ancients abandoned themselves to luxury and sensuality their ancient strength forsook them,

and they lost their primitive valour.<sup>1</sup> So much for theory. But in practice half or the whole of our endeavours are expended on schemes for spending life as comfortably, luxuriously and pleasantly as possible.

Thousands are racking their brains night and day to devise how they may save their fellow-creatures all labour or effort, even that of moving a few steps, by the invention and manufacture of countless requisites and paraphernalia calculated to make people more comfortable and lazy. Eagerly do we welcome these appliances, and are grateful for every such enervation; and regard the nations who were wont to disdain such indulgences, and chose a simple and rugged life for the sake of retaining their manhood, with mingled contempt and condescension.

Nevertheless, at bottom we are not inferior to our progenitors. Man—"that sojourner forlorn upon the darksome earth"<sup>2</sup>—is still great, whether he be wild or civilized, Greek, Briton, or Chinese, a subduer of nations or a disenchanted wailer over human tribulation, and his tragical history is a spectacle for the angels, for Satan, and for the Elohim. He is not self-endowed; nor can he strip himself of his significance. By the grace of God he is an indefeasible sovereign. Even his indigence, his destitution, his very famine, is great, so great that the whole world cannot appease its pangs; great is his wickedness, great his perdition, his depravity. And, therefore, his ideal, whether it be the nomadic life of the patriarch, or the *aestheticism* of Greece, or the *imperium* of Rome,

<sup>1</sup> Horace's favourite homily also, rather preached than practised:—

"Eradenda cupidinis

Pravi sunt elementa, et tenerae nimis

Mentes *asperioribus*

Formandae studiis."—*Carm.* III. 24. (E.K.S.)

<sup>2</sup> Goethe.

or the scientific philosophy of modern times, has its proper greatness too. For it is the perpetual embodiment of his vast love or hatred, his great faith or unbelief, his mighty hopes, sorrows, doubts, despair, and in this arena he wrestles with heaven and hell, though not seldom unwittingly, for his very life, and would fain resign himself for ever to any power able to sate his hunger, still his doubt, and put an end to his desolation of soul.

How does this child of the dust, resident here but a short moment, subjugate nature ! How is he visibly the lord of creation ! He weighs and measures both the imperceptibly small, and the twinkling constellations and their distances, and has framed eyes which reveal a world in a drop of water, and clusters of suns inconceivably remote in the darkness of the firmament. This Prometheus gallops on a steed of fire ; fire carries him across the sea ; fire forges his artillery, sows his corn, bakes his bread, weaves his clothes, an obsequious minister to his demands ! He draws invisible stars, as well as the cannon-ball in motion or the inner organs of the body, with rays of light, and speaks by lightning from the Old World to the New. He is suspended between infinities of littleness and immensity, form and colour ; swims in an ocean of pure ether fraught with forces, yet is supremely frail ; dwells in a world teeming with life and is gnawed by the tooth of death ; bathes in floods of light, and yet how dark his mind, how benighted his heart ! It was but yesterday that he dropped into this world, whence he cannot say ; has glanced restlessly round him, had a bout or two with nature, stood up in a desperate conflict for his share of existence and food (for nature is like to annihilate him), and to-morrow he waxes pale, droops his head, and anon he is fled. Whither his path has wended his kinsmen on earth cannot tell ; most of them leave it out of discussion, and resume their hurrying and scurrying and struggling for themselves.

More and more jaded by this same hurry and scurry, and more and more aware of the futility of his endeavours to reconcile and embellish mortal life, and to raise the human family to a peaceable and settled condition, weary of himself and his kind, the modern thinker reverts to nature, hoping to discover some complacency there, and a turning-point or foothold for his storm-vexed spirit in the investigation and observation of its noiseless, unruffled dominion, its wise, irrevocable laws. Here also God meets with him, and would divert him through the medium of nature from his artificial, meretricious conceptions, heal his fever, delirium and self-seeking, presenting him with knowledge, and great and fair vistas opening into His marvellous creation, "if so be that he may find Him therein."<sup>1</sup>

Such then is the modern conception of nature and the surrounding world. The universe has grown to a stupendous unity and whole, interpenetrated with wondrous forces, extending from the deepest depths of the infinitely little in elemental atoms to the highest heights, the longitudes and latitudes of nebular space; immeasurably transcending all human wisdom and discovery, and overwhelming the mind of the child of earth, so as well nigh to crush him beneath its power and majesty: a panorama nevertheless, the contemplation of which fills the soul of every one who can to any extent grasp its salient features with fortitude and exultation that he is alive.

<sup>1</sup> Acts xvii. 27.



## CHAPTER III

### Christianity and Science

A philosopher will examine more strictly than ordinary men the proofs brought for a proposed revelation. But that is no disadvantage to a supernatural religion such as the Christian, if it be true : and the real truth about religion does not require credulity, but docility.

ROBERT BOYLE : *Christian Virtuoso*, p. 109.

#### I.—MISTAKEN NEGLECT OF IT

IF we have been dazzled by the grandeur of the universe regarded in the light of modern science, the question that next presents itself is this : What is the bearing of Christianity (by which term we wish to be understood to allude not to nominal but genuine Christians) towards this vast aggregate of physical research, which more and more at the present day sways its sceptre over the entire life of man. For, like all other knowledge, it is divinely pre-ordained, and bestowed on him, not for his injury, but his physical and moral amelioration. Alas ! we are obliged to reply that in general Christianity assumes towards natural science a bearing unworthy of itself, and, where not positively hostile, treats it with petty distrust, and an admixture of scorn, or at least with some aversion and distaste.

Instead of expending time and pains in studying the products of this field of labour (certainly not devoid of historical significance), and instead of winnowing truth from error, the corroborated from the merely speculative

elements, and stoutly gainsaying and refuting science where it draws false conclusions, yet not without exulting in the majestic, august horizon, which it unfolds to the mind, the majority of Christians, after a few remarks fired off at random regarding the fallibility of human knowledge, or to the effect that even scientists do not know everything, prefer to betake themselves to the domain of pure edification and the sphere of the affections, where they feel less exposed to the unswerving logic of facts, the rigid mathematics of the universe. As if knowledge, too, were not instructive, and the creation of the world no less a divine act, or less worthy of observation, than its redemption. Does not the law of Moses rest upon a divine conception of nature? Does not David seek edification in the inspection of God's world as well as of His law? And do we not see how Jehovah Himself, when He descends in the whirlwind to convince Job of the inadequacy of his self-extenuation, points him in the sublimest imagery to creation as so great a revelation of Divine power and wisdom, that in view of such a spectacle man must shut his mouth? What, again, is the subject of prophecy, that prophecy which we are not to treat lightly or despise? Chiefly, no doubt, the accomplishment of the promise which God had sworn to Israel to fulfil; but, in the second place, the redemption of nature and the renovation of a Divine universe. With such a restoration the Book of Revelation is brought to a close.

The Bible is full of the relations of man to nature, and of the ultimate renewal of a Divine and eternal economy. How can that be anything but instructive? The man to whom the entire universe is not matter of edification has probably not yet comprehended that edification is a spiritual upbuilding of the inner man in God, although we have no reluctance to grant that there is a special form of it purely founded on Christian doctrine. But must not

man live on *every* word that proceedeth out of the mouth of God, and therefore, amongst others, on the everlasting words of creation in Genesis? Yet there are still many divines who regard matter as a thing framed once by the Creator, but now impregnated with sin, abandoned by Him to the sway of certain determinate forces, and devoted to final destruction; and view the universe as hopelessly and irrecoverably marred by Satan, and now amenable to his lordship, though Paul declared even to the pagan Athenians that "in God we live, move, and have our being." They fail to recognize that creation is a Divine handiwork replete with Divine and imperishable ideas, bodied forth in stone or plant or animal, momentarily sustained in being by the Divine breath, and destined hereafter to unfold for ever in the heaven of heavens,—ideas bestowed by God on man that he may confess His power and greatness. And so any understanding of the import of creation as a Divine revelation is precluded. No wonder that such a demeanour is frequently regarded by a scientific age, more and more cognizant of the significance and universality of natural forces, as an effete standpoint, no longer abreast of the moral development of the race, and divested of all practical utility or value.

There is a twofold mischief entailed by this petty suspicion and careful avoidance of scientific knowledge. In the first place the individual Christian incurs loss by rejecting this God-given opportunity of enlarging his outlook and conceptions; whereby harm must necessarily accrue to his religious life. For we imbibe our ideas and impressions from the creation that encircles us. God has given us senses with which to perceive, and through sensible perception attain to some degree of moral insight. The history of every child certifies us of this. We see, hear, and taste, and we acquire thereby a mental sight

hearing, or sensibility. Otherwise we might as well have been left to live and die in a monk's cell, according to the resolve of multitudes in former days. "Beautifully," says Liebig, "does Luther remark in his *Table-talk* the taste for nature and science consequent upon the Reformation: 'We are now in the dawn of a future life, for we begin again to crave a knowledge of the creatures which we lost by Adam's fall; now we behold the creatures aright. We begin, by God's grace, to discern His wonders and works even in the floweret. We behold the power of His word, how mighty it is, in His creation.'"

Man was created as a whole. He cannot impoverish his capacity for a knowledge of nature without impairing his spiritual understanding; if he entertains vague, dubious, confused conceptions of the visible creation, how can his thoughts of the invisible be clear, precise and consistent? We must inure ourselves first in contemplating things concrete, if we would think perspicuously and logically of abstractions. Nature instructs us that mere sentiment is not an active principle in any creature, but a passive, though attractive, quality; indeed, overwrought feelings cripple the power of resistance against adventitious impulses. Emotionalism does not conduce to moral improvement, nor promote the growth of the inner man.

In the next place the Christian community thus exiles itself from the pale of general culture, which at least in this respect has been making progress, and loses touch with modern intellectual life. What wonder if serious, but non-Christian, scientists smile good-humouredly at Christians as fanatics who repudiate the plainest mathematical demonstrations, but demand of others an unconditional belief in miracles which, from their point of view, are undemonstrated? Or that so many young men at our universities confess that their whole Christian outlook has vanished in consequence of an acquaintance with the



much grander and more imposing philosophy of science? For it has been justly observed that "the Deity of the modern scientist is a more exalted, august, and infinite Being, and more to be feared than that of the average Christian."

It is high time that positive theology should cease combating the mere creed of predetermined negations, with its fruitless contradictions and mutually conflicting denials, and set itself the task of providing an adequate Christian philosophy for the common people—adequate, because based on the steadfast foundation of truth. For the spiritual death, of which these negations are the progeny, cannot be vanquished by refutations and confutations, but only by spirit and life. Ought the son of the house to comprehend what his father is about less perfectly than a stranger? The fact that the children of God know (and care to know) so little of the works of their own Father is one of the things that arouse grave suspicions in the ungodly of the filial claim of many Christians, who behave very much as if the observation and study of these things were positively deleterious to their souls, and might lead to estrangement and apostasy from Him. Must the son of a famous architect refuse to examine his father's buildings, or the son of Bach never listen to the *Matthäus-passion*, in order to retain the childish reverence which each had formerly cherished towards his father, and not be led to question altogether his existence? The man who asserts that he has lost faith in God through study of science has never known Him.<sup>1</sup> Is it not written, "The

<sup>1</sup> "I am persuaded that nature will be found very loyal to her Author, and instead of alienating the honest mind from making religious acknowledgments, will furnish him with weighty and uncommon motives to conclude such sentiments to be highly rational and just."

Robert Boyle: *Christian Virtuoso*. (E.K.S.)

spirit in man searcheth all things, yea, the deep things of God" ?<sup>1</sup> "Why," in the words of Boehme, "dost thou think so earthlily of thyself? Why dost thou let thyself be duped by Satan, as if thou hadst not been born of God? How then shouldest thou not have power to speak of God thy Father, of whom thou art? Behold, this is His world: if His light dwell in thee, it is thine also."

## II.—CAUSES OF THIS NEGLECT

Whence then originates this aversion of numbers of Christian people from modern science, and this suspicion of it? We will specify a few causes out of many. First of all, it arises from ignorance of its methods. Dazzled by the long words and yet longer phrases of that technical terminology which many scientists are so fond of parading, and by an imposing array of instances, they conclude that the comprehension of such subjects is beyond an onlooker's capacity, and an independent judgment out of the question. That may be true of minor particulars, but the great themes of interest to the human mind are happily within the reach of all who are willing to give them a little pains and study. Any one possessing average intelligence, and equipped with an elementary knowledge of mathematics, who applies himself for an hour or so to determine, by the aid of any treatise on astronomy, whether, and by what process, we are able to measure the distance, size and weight of the heavenly bodies, and whether the earth really revolves round the sun, may arrive at no less certainty about it than that forty-five is three times fifteen, and need never pin his faith in future to any man's authority. But since there are still found educated people to whom mathematics are so unfamiliar that their heads

<sup>1</sup> But the apostle is here speaking not of the "wisdom of this world," but of spiritual truth (1 Cor. ii. 10); and the text is not correctly quoted. (E.K.S.)

turn at the very mention of billions and trillions, as if these were hazy, phantasmagorical conceptions, an example or two may serve to show how very simple astronomical calculations dealing with quintillions and sextillions may become. How many grains of sand would the whole earth contain, supposing it to consist only of such grains? Taking each grain (with the interspace) as  $\approx 1$  cubic millimeter, we get for each cubic meter 1000,<sup>3</sup> or 1000 million grains of sand. Now the circumference of the earth is well known to be 40,000 kilometers, its content therefore roughly 1080 milliards of cubic kilometers, or a thousand million times more cubic meters, multiplied into the above thousand million cubic millimeters; which makes a number consisting of 1080 and 27 ciphers. And seeing that we know the weight of a cubic meter of sand, we might ascertain the weight of a globe of sand in two minutes more. Or let us put the question how long a snail, travelling at the pace of one millimeter per second, would require to creep round the earth, and the calculation will be found to be still simpler. As observed above, the circumference of the earth amounts to 40,000 millions of millimeters; accordingly it would need just as many seconds; that is to say, twelve hundred and sixty-eight years, one hundred and forty-two days, twenty-three hours, six minutes, forty seconds. Obviously, a boy of ten can do that sum. It is certainly true that this calculation is not strictly accurate because adjusted to an imaginary horizon-line; and that brings us to a second point, too little remarked by the general public, namely, that all calculations and measurements, even in practical life, are, and require to be, exact only up to a certain point. No joiner can measure a table precisely, and no housewife gets a real pound weighed out to her at the market; indeed, if any one fancies that he receives any absolute size or weight even when he takes ten shilling pieces, he is under a delusion. They are worn,

and not perfectly alike or equipollent ; nay, their ponderability varies at the equator and the poles, on a mountain-top and in the plain. Like all the rest of our knowledge, our mensuration is only relative, and the man of science must ascertain not merely how he is to measure, but—a thing often much more difficult—with what degree of exactitude he has measured. But then mistakes are also relative, and if an astronomer commits an error of one thousand million kilograms in weighing the sun, this measurement is still incomparably more accurate than when an apothecary weighs out to us a pennyweight of quinine, no matter how exactly he does it, or how good his scales. We know the distance of the sun to a fifteen hundredth ; we cannot estimate the length of our garden so nicely as that. It is a mark, therefore, of an uninformed mind to disparage astronomical measurements as valueless, illusive data because liable to an uncertainty perhaps of some millions of miles. In a case of so-called “ stellar distance ” (20 billion miles) the  $\frac{1}{4000000}$ th part, five million miles, is an inappreciable magnitude, a negligible quantity. If it be asked how it is possible to measure the period of one of Jupiter’s moons to a tenth of a second, the answer is that it cannot be done by observation of one revolution. But granting that the starting-point is fixed erroneously by half-a-minute, and that after computing six hundred circuits the terminal point is assigned with an error of equal magnitude, the mistake amounts only to one minute, or, distributed over six hundred revolutions, only to one tenth of a second ; in six thousand revolutions no more than  $\frac{1}{100}$ th of a second. And as to the question so often discussed, whether we possess any clear, unchallengeable proofs that the earth moves round the sun, an individual of ordinary endowments can perceive logically, by a study of the parallaxes of the fixed stars, and indeed with his bodily senses through great teles opes, that the orbit of



the earth describes a tiny ellipse in reference to every fixed star.

It is no less easy for any one armed with the simple trigonometrical principle that a triangle is given if its base and two adjacent angles are known, by means of such a theodolite as he can construct for himself, to measure from two windows of his house the distance of a tree, tower or other house without going out of doors; and that is exactly how the distances of sun, moon and stars are measured.

The difficulty does not lie in the simple and mathematically infallible process, but in the numerous precautions, forming in themselves almost a science, which are the sole guarantees for the accuracy requisite where great distances are involved, an accuracy which enables us to measure magnitudes in the heavens that are equivalent to the diameter of a hair thirty feet away from us! Similarly, no one need be a *savant* or specialist in chemistry, physics or geology, to gain a clear comprehension of the method, certainty or limitations of the science; and it is here that the fundamental principles are most perspicuous and intelligible.

We should, then, seek first of all a clear insight into the methods of science in regard to observation and correction, and not content ourselves with popular scientific volumes, which, with their "effective" illustrations and highly-wrought descriptions, seldom or never touch the kernel of a problem, nor give a correct impression of the methods of investigation. The most important part of the study is ordinarily the least attractive to the general reader. In geology, for example, it is a lucid exposition of the succession of strata and their intricate displacements; in astronomy, its mathematical groundwork, and the tedious procedure of registration and correction; in chemistry, the atomic theory and its corollaries. He who

is not conversant with these fundamentals, being disqualified from forming a personal judgment, will oscillate endlessly between the divergent and not unfrequently repugnant views inculcated in books or lectures by each expert or amateur as his private hypothesis. Now, as a matter of fact, the knowledge indispensable in scientific matters does not exact any great expenditure of time or labour. If the leisure consumed in desultory, interminable conversations about science, materialism and Christianity, the impossibility of certainty of knowledge and so on, were employed in a serious, systematic initiation into the elements and leading theories of the sciences, there would be much greater clearness and assurance of mind in regard to them. The skill of a specialist is usually superfluous for a correct appreciation of natural philosophy. An honest mind as well as a master-intellect feels undoubtedly the need of a universal education, but also the necessity of not losing himself in details. Every educated man ought to know what an ammonite is, the limits of its size (from five feet to two millimeters), the differentiae of its species, the chambers and lobes and particular types, with their chief strata (e.g. *Am. Bucklandi*, *Am. Amaltheus*), but it is needless for him to be acquainted with the four hundred, or, according to others, eight hundred varieties and sub-varieties, with their Latin titles and localities. It is only the knowledge which is the result of a man's own labour that has any mental value.<sup>1</sup> Galileo was right when he said that it is a misfortune for people to receive the assertions of others as the groundwork of

<sup>1</sup> "The floating of other men's opinions in our brains makes us not one jot the more knowing, though they happen to be true. Such borrowed wealth, like fairy money, though it were gold in the hand from which we received it, will be but dust and leaves when it comes into use."—John Locke : *Essay*, Bk. I. Chap. 4. (E.K.S.)

their opinions, and not the essence of things themselves. True scientific knowledge should influence us, but the childish homage paid to professorial dogmas has deplorable results. "It has unfortunately become the fashion among the so-called educated classes thoughtlessly to retail, with a sense of their own incompetency, what men who have pushed themselves forward in some special branch of research often write or speak with most unjustifiable precipitancy. No one should degrade himself to the rank of a mere ruminating quadruped."<sup>1</sup>

In the next place, this anxious mistrust of science is founded on a confusion of fact with elucidation of fact, its frequent substitute. That is fact which is susceptible either of mathematical demonstration, as that the three angles of a triangle are equal to two right angles; or of actualization at any moment by experiment, as, for instance, that oxygen and hydrogen in combination form water, and that chlorine and sodium produce the well-known yellow line at a specific point in the spectrum; or lastly, what is capable of establishment by adequate and accredited testimony, as the circumstance that meteoric stones fall from the sky. A fact is a truth of the universe, an actual occurrence against which all resistance is futile, which cannot be impugned by any theory or system; for which reason it was that a witty Frenchman once exclaimed splenetically: "*Il n'y a rien de si bête qu'un fait*," or, in our own phrase: "Facts are stubborn things." That "awkward customer," however, has this peculiarity, that as there are no such things as good or bad facts *per se*, there are none in themselves either religious or impious. Since the world began, and so long as heaven and earth shall last, there neither has been nor will be found one fact evincing that there is no God, or that the soul is not immortal, or that Jesus Christ

<sup>1</sup> Spiller: *Das Leben*, p. 48.

did not come into the world as God incarnate to die for us sinners, nor one solitary fact disproving the resurrection of the dead, or that the sick can be made whole by prayer; and that because facts cannot prove a negative proposition. Thus the truth that thousands of millions of stones have exhibited for centuries not the slightest spontaneous attraction, does not shake the steadfastness of that other fact that the lodestone attracts iron without contact with it; which, let it be remarked by the way, is one of the most astonishing phenomena of matter. Facts considered alone are like the unpointed consonantal Hebrew letters, hollow, indeterminate, and therefore insignificant forms; they only become vitalized by the addition of vowels instinct with sound. And precisely as in that language various vowels can be mentally supplied, spoken or read, to characterize the same consonants, whence a difference results in the sense; so we may observe every day that identical facts receive different, and indeed not seldom contradictory, interpretations.

Facts are words which, whilst they possess a potential meaning and significance, yet, taken singly, afford no indisputable sense. A mental power and purpose must co-ordinate them ere an intelligent proposition emerges to view, and even then much turns upon correct construction; otherwise the subject may easily become the object, and cause be interchanged with effect. "The senses place before us the characters of the Book of Nature; but these convey no knowledge to us till we have discovered the alphabet by which they are to be read."<sup>1</sup> Phenomena taken apart do not explain themselves: it is only their co-ordination with antecedents and conse-

<sup>1</sup> Whewell: *Philosophy of the Inductive Sciences*, Aph. II., or, in Aristotle's enunciation, τότε γὰρ οἰόμεθα γινώσκειν ἕκαστον ὅταν τὰ αἷτια γνωρίσωμεν τὰ πρῶτα καὶ τὰς ἀρχὰς τὰς πρώτας. —*Phys.* I. i. (E.K.S.)



quents that advances us on the path of true knowledge. If you tell a day-labourer that the "hydrogen line in Sirius shows a displacement towards the red," he will gaze stolidly at you and say, if he finds his tongue at all, that it may do so, "for all he cares." This fact, associated with no other in his brain, is for his mind empty and meaningless, and perfectly uninforming, even if you were to show him the circumstance in the spectroscope. He has less appreciation of it than a child has of an uncut diamond. But inform a person conversant with astronomy of this identical fact, and a train of interesting and absorbing ideas is awakened in his mind; he deduces from it by the aid of certain other facts of which he is aware that this gigantic sun is retreating from us with a velocity of eleven hundred and eighty-eight million kilometers per annum; and in the degree in which he is gifted with imagination he sees with the mind's eye this great world plunging through space and time to an unimagined goal, a theatre of action of an extent to which our globe offers no counterpart.<sup>1</sup>

<sup>1</sup> The ground of this inference is as follows. There exists a method of measuring stellar motion in the direction of the visual ray, arising from an optical peculiarity observed in such cases. If the stellar spectrum were motionless, a luminous ray proceeding from a tube filled with gases coincident with those recognized in the star in question would be simply superimposed on the above-named spectrum: but, should it be approaching us, the refrangibility of each colour will be augmented, and there will be a displacement of the light of the star in motion towards the violet end of the spectrum; if, on the other hand, it is receding from the observer, the displacement will be towards the red end. An analysis of rays thus determines, on optical principles, the motion of recession or approximation, as the case may be, and a mathematical formula has been found to express its rate.

Cf. Mendeléeff: *Principles of Chemistry* (Eng. Tr.) c. xiii. n. 34, and Flammarion's *Astronomy*, pp. 648, 9. (E.K.S.)

When a number of facts have been congregated together, they must be interpreted by subsumption under some general principle previously established, and by the assignment of the known category in which they are to be placed. But science has its predilections, and is subject to vicissitudes of fashion. The perpetual transit of the earth from its aphelion to its perihelion, the circulation of the water on its surface, its trade winds and monsoons, are an apt image of the revolving cycles of human thought. These intellectual currents give a direction to science, impelling it to a certain class of inference, and rendering particular theories sympathetic or antipathetic to it. That of our own day bears the stamp of Uniformitarianism and negation. Our moral emasculation favours a temper to which the miraculous is repugnant. It is curious to notice how the same epidemical infirmity of spirit seeks to eliminate every sudden manifestation even of "natural forces." "No more catastrophes or cataclysms," is its cry; "for these are, as it were, the shadow of a Figure behind the arras. No more successive epochs of creation, no more demarcation of species, no more extinct suns or new constellations; they are only variable at long intervals. Above all, no final conflagration. The universe came into being with perfect tranquillity, and the globe will perish after many, many millions of years as serenely and imperceptibly." A highly soothing persuasion!

For similar reasons the notion of a central fire beneath the soil is eminently distasteful. Though assenting to Laplace's hypothesis of the origin of the celestial bodies, nor disputing that the planets were at one time little suns which are in process of cooling, in which case a central fire must have existed, this school ignores the evidence of hundreds of active or extinct volcanoes, of thermal springs, and the increase of temperature as we descend into the

earth ; and resorts to the most precarious conjectures to avoid the supposition that the globe is still a fiery ocean covered with a comparatively thin solid incrustation. And why ? First, because it is the correct thing to deny all that our fathers believed, and to innovate at any price. But I suspect a more recondite and implicit reason. This fiery ocean is uncommonly displacent to us because it recalls with painful distinctness the notion of Gehenna and Inferno. It is far more reassuring to conceive of the lower regions only as enormous masses of trachytic and basaltic rock. And so we presume that eruptions are merely local, due perhaps to layers of iron pyrites. The frequent interaction of remote volcanoes and the identity of their lavas is imputed to communicating canals, vent-holes, etc.—in short, there is not the slightest reason for being alarmed ! Yet terribly sudden seismic and volcanic disturbances still occur now and then. Mount Jorullo rose 1,600 ft. in a single day in 1759 ; in 1783 Hecla threw out rivers of lava nearly fifty miles in breadth in a few hours ; and more recently (in August, 1883) Krakatoa vanished in the sea with half a large island, accompanied by an explosion shaking the ground for hundreds of miles round, and forming a wave which circumnavigated the globe in half a day.<sup>1</sup> Besides, it is plain that the cooling of a body in a state of fusion like our planet could not take place without tremendous conflicts between fire and water, without violent ebullitions of the liquid components against the contracting exterior crust.

When this Quietist predisposition has gone out of vogue, people will wonder how it could have been seriously entertained. It is an ordinance of God that the human race,

<sup>1</sup> The recent terrible eruptions (May, 1902) of Mont Pelée in Martinique and La Soufrière in St. Vincent, have reminded the world again of the proximity of these cataclysmic forces.

(E.K.S.)

with all its fine-spun speculations, should suffer continual shocks; that cyclones should dash its ironclads against reefs, earthquakes overturn its palaces and cities like card-castles, and inundations submerge whole provinces. For He knows that these chastisements are essential, if it is not to putrefy with pride and self-sufficiency.

### III.—DARWINISM

The elucidation of fact then is what either the greatest scientist or the most unlettered of men regards as its mental substratum—in short, a matter of private judgment. It should be tested with calm deliberation by its adequacy to explain thoroughly the phenomena concerned, and by its correspondence or incongruity with those phenomena. Whereupon it will frequently be discovered that it introduces more into the conclusion than the premisses contain. A striking example of this precipitate transfer of observed facts for speculations rightly or wrongly deduced from them is afforded by the Darwinian theory. This doctrine, which was first broached by Empedocles in 470 B.C., then advocated by Lamarck, and further elaborated by Darwin, who supplemented it with the hypothesis of “natural selection,” and “origin of species,” has thrown the intellectual world into such strange commotion that it deserves to be canvassed somewhat closely.

In his *Philosophie Zoologique*, Lamarck had attempted to prove that the animal world consisted of a continuous chain, beginning from the infusoria and terminating with man. “As the giraffe lives in the interior of Africa, where the soil is constantly arid and bare of vegetation, the animal was forced to feed itself on the boughs of trees.” Here is environment. “Through constant raising of the fore part of the body and straining of the neck, both eventually grew to such a length that its mouth can with-



out the slightest exertion reach a bough at a height of twenty feet from the ground." Here is adaptation. In a similar way, the cat's claws were explained by long-continued scratching, and the tail of the kangaroo by persistent sitting." Lamarck also assumed "un temps énorme" in support of his theory.<sup>1</sup>

The observations of Darwin were at first drawn, during the Beagle expedition to South America in 1831-6, to the variation which organisms, particularly animals, undergo owing to varieties of climatic influence, food, breeding, domestication, and allied physical conditions in general. He made shrewd and valuable notes of this very interesting circumstance, and proceeded to study the changes produced in the lapse of several generations by external influences, discovering in many cases a really remarkable accommodation to "environment," a capacity, in fact, for acclimatization; and further, that this was favoured by "natural selection," whereby it is usually those individual members of the species which are most pliable and survive triumphantly the "battle for existence" that multiply reciprocally.

Darwin would have remained on the impregnable ground of fact, had he confined himself to the enunciation of some such propositions as these:—

1. Species possess a certain elasticity which capacitates them for adaptation to external conditions, yet with this restriction, that it is chiefly the outward properties

<sup>1</sup> Quenstedt: *Die Schöpfung*, p. 24. "Some naturalists have a vague notion that merely mechanical weapons may be developed by use. But how will this law of growth adjust a poison in one animal with such subtle knowledge of the organization of another that the deadly virus shall in a few minutes benumb the nerves, and rush in upon the citadel of life? Here a *mental* purpose is the one thing that our minds perceive with direct and intuitive recognition." Duke of Argyll: *Reign of Law*, p. 37. (E.K.S.)

such as colour, growth of hair, etc., that are affected; whilst the internal characteristics, on the other hand, the anatomy, teeth, viscera, and the voice are less amenable to modification.

2. This adaptation has its limits: when these are reached, the individual perishes, the species dies out. The nearer the forms are to the original species, the more capacitated for life: the farther they recede and deviate from it, the more evanescent they are.<sup>1</sup>

3. Should the external influences or merely artificial conditions revert to their original, normal character, should culture, for example, cease, and animals or plants become wild, the species recurs undeviatingly to the primitive type.<sup>2</sup>

But there was a great fascination in the conjecture that the plasticity of organisms was illimitable in an unlimited period. On this supposition species retain merely a relative value for briefer epochs of time, as a means of facilitating the alleged origination of all varieties from a primordial cell endowed with infinite potentialities; although one can see no reason why, even in that event, merely local types, a single type for a particular stretch of water, should not have been produced. So we find Darwin saying of the giraffe which Lamarck had intro-

<sup>1</sup> "A real species will be conterminous with the outermost limits of the sphere of ascertained variability."—Cook's *Boston Lectures*.

<sup>2</sup> "Ordinary reproduction tends to eliminate all variations whether produced by habit and use or by obscure causes affecting the individual." . . . "There can be no doubt that one use of cross-fertilization in nature is to keep the species true to its characters. Thus the processes which evolution relies on in the interest of descent with modification are precisely those which the Author of nature has established to prevent such modification."—Sir J. W. Dawson: *Modern Ideas of Evolution*, pp. 34, 92. (E.K.S.)

duced that it obtained its long neck, not by persistent elongation, but by "natural selection." Africa was once visited with a great drought; the vegetable growths of the soil withered; only a few animals furnished with long necks were able to sustain life on the leaves of trees; all the short-necked died out, unless they could climb. The long-necked varieties then transmitted their line, and if this drought was often repeated, such a neck as that of the giraffe might ultimately result.<sup>1</sup>

But in elaborating this theory, Darwin had relinquished the domain of undoubted fact for the unsubstantial territory of pure conjecture or speculation. To do him justice we ought to remark that he himself spoke modestly of his view as an idea awaiting actual confirmation, and still hoped to discover "missing links"; but his disciples and acolytes, as usually happens, fastening on the notion, exalted it forthwith to the rank of a dogmatic scheme of creation. Indeed, it was extremely gratifying to many of them to be able, through the medium of an attractive and imaginative hypothesis of the "descent of man," to announce a conclusive victory over the "mythical, superannuated Biblical history," and to relegate the Creator, if not wholly outside His creation, at any rate to its utmost verge, to a primordial cell of a primeval epoch. Many fancied that one more step only was now needful, and He would be fairly abolished, and they at last rid of Him! For Spiller observes: "*Unfortunately* Darwin himself is of opinion that the Creator infused life into the primordial type on behalf of all future existences."<sup>2</sup> And many Christians read with foreboding the tidings of the discovery of the evolution of all life by natural causes, and wondered in private whether they could not or must not contrive to translate their old Biblical conception of

<sup>1</sup> *Origin of Species*: pp. 178, 9.

<sup>2</sup> *Das Leben*: p. 72.

*Book completely outdated - no one  
person entertain views of the sort on H-  
ever, one who admits that*



a Creator into terms consonant with the "latest advances of science."

But there are inexorable facts that confront this illicit generalization. The plasticity of organisms is not by any means of indefinite range. No culture on the part of any gardener can transform an apple into a pear-tree, or a peach into an apricot, closely similar as these fruits are. All the costly and protracted attempts of the Prince of Schaumburg to produce from the hare and rabbit a cross-breed for sporting purposes have failed, although the two species are differentiated almost solely in this respect, that the rabbit brings its young into the world in a blind and naked state, and therefore lives in a burrow of its own excavation, whilst the leveret runs about immediately after birth fully coated and with eyes unclosed, and consequently dwells beneath the open sky. Hybrids derived from the horse and ass, again, are sterile. Moreover, it is a fact that all tame varieties of pigeons—fantails, tumblers, pouters, croppers and runts,—left to themselves on a desert island revert to the same original, slate-blue wild-pigeon (*columba livia*), and even the two dark rings round the legs make their reappearance. Indeed, that was one of the earliest facts that caught Darwin's attention, and should have guided him to the right track. The four thousand (others say six thousand) varieties of roses, moss and *noisette*, *Maréchal Niel* or *Gloire de Dijon*, monthlies or *centrifolia*, recur again to the lovely wild rose, as soon as their cultivation is suspended. The naturalist knows too that all the innumerable kinds of dogs, fox-terriers and St. Bernards, dachshunds and greyhounds, can be retraced to the original type of the wolf-hound (*canis lupus*), the fox or the jackal. Again, the choicest kinds of orchard fruit quickly degenerate: the finest pine-strawberries, abandoned to defective oversight, become fragrant wild berries; and the pippins of juicy Bergamot



and Beurée pears produce in the second generation wilder varieties, reverting to the original wild-pear stock.

To prove the fixity and immutability of the type,<sup>1</sup> numerous examples might be adduced. The grains of wheat found beside Egyptian mummies bear a plant identical with ours, though larger and more prolific; and so do the cornflower and clover seeds sown after they have been found in Celtic tumuli two thousand years old. It is well known that the mummies of the ichneumon, serval, wild cat and Nubian cat in Egypt tally perfectly with the modern varieties and indeed sub-varieties. The swallow builds its nest and the modern bee its cells, and the spider spins its web exactly as they did three thousand years ago. The hazel nuts and other fruits from the lake-dwellings, and those found at Pompeii, are the same as our own. Cave-bears and lions are distinguished from surviving species only by their size; and we have seen that the oldest human skulls could, some of them, compete, as far as facial angle, craniological formation and content are concerned, with the finest of modern times. When we discover in organisms four thousand years old the same species, with such diversities as present themselves to-day between individuals, we are justified in confronting the arbitrary dictum of Darwinists, that species alter in immeasurable periods with the assertion, also arbitrary, but better borne out by facts, that they do nothing of the kind!<sup>2</sup>

<sup>1</sup> "Anatomical facts do not conduct us to the conception of a transformation of organisms, but to that of a seemingly inexhaustible multiplicity within strict limits."—Fleischmann: *Die Descendenztheorie*, p. 200 (Georgi, Leipzig, 1901).

<sup>2</sup> "The living members and fossil remains of the animal kingdom are the material of the zoologist. They are as little susceptible of genealogical elucidation as the origin of mechanical laws is to the physicist, or the formation of the elements to the chemist."—Prof. Fleischmann: *Die Descendenztheorie*, Pref. iv. (E.K.S.)

To predicate infinite periods for these transformations is as gratuitous as to conjecture that resembling elements would pass through a similar permutation, and iron be metamorphosed in the course of ages into gold. The appeal to infinity or its equivalent in aid of a scientific theory converts it into a metaphysical speculation.

But undoubtedly it is in geology and the study of fossils that we meet with the most decisive refutation. Facts testify unmistakably against Darwin in this region. In those strata which evolutionists themselves regard as many hundreds of thousands of years old, leaves and branches of elm and lime-trees are found perfectly resembling ours; in the amber of still more ancient formations spiders, and in Solenhofen slate *libellulæ* like ours occur; and in coal-bearing strata tree-ferns, araucarias and palms similar to present-day tropical specimens. These plants and animals appear in hundreds and then die out; they disappear and give place to higher forms without making one attempt to "evolve themselves" into a loftier type. First of all we see a gigantic vegetable creation (e.g. the present Carboniferous formation), preceded by a number of minute aquatic animalculæ. That vanishes, and the Jurassic period ensues, with its millions of *sauria*, its pterodactyls and sparsely-scattered birds. These in turn disappear, and the Cretaceous formation peoples the earth with the modern shark and quadrupeds, and the foliage with which we are familiar. Lastly (but also first) in the alluvial strata man appears. Certainly intermediate forms occur, just as they pervade the creation to-day, but there are no instances of transition. Let us look at one only of the great divisions. In succession to certain anthracites formed out of sea-weed in the Old Gneiss formation, there appear as the first animals not, as the Darwinist would lead us to expect, inferior sponges and corals, but hundreds of varieties of highly

developed trilobites, crustacea with fully defined heads and as many as eight thousand facets in their eyes.<sup>1</sup> There are small, insignificant organisms which remain through all geological periods, appraised by many Darwinists at millions of years, wholly unaltered and unmodified by any principle of evolution. It is true, there are certain kinds of snails among them which divaricate from one another in the course of time. But a universal system cannot be grounded upon rare anomalies or freaks of nature. What weight attaches to such exceptions in the face of the thousands, nay millions of organisms that exhibit no evolution whatsoever?<sup>2</sup> Thus, the tiny mussel *lingula*, which appears already in the oldest fucoid sandstone in company with the first and simplest plant formations, maintains its place unchanged throughout. Quenstedt tells us that "many *terebratula* coincide with the existing *Waldheimia*." Of the molluscs, many different kinds of nautilus, encrinites and pentacrinites, though diminished in size, still survive in the seas of the Antilles, as well as the arrow-crab (*limulus*) in the Pacific. Why have these organisms undergone no evolution? Nowhere in all these strata is there found one tribe of calamites or *equiseta* that has evolved itself into an araucaria, or a trilobite developed into an ammonite, or a plesiosaurus or ichthyosaurus which betrays symptoms of a consuming aspiration to become a shark; not one fish maturing into a tortoise or crocodile or one bird promoted to the rank of quadruped: for, generally speaking, birds and the countless tribes of insect life appear as spheres that do not intersect. Moreover, in spite of so

<sup>1</sup> *Petrefaktenkunde*: p. 556.

<sup>2</sup> Cf. Sir J. Dawson: *Modern Ideas of Evolution*, p. 86, and the account which follows of the eyeless Cave Fauna of Kentucky, which show a capacity of restoration significant of the permanence of the type. (E.K.S.)



many billions of existences and such vast geologic aeons, not one plant or tree is seen gradually emerging into an animal. Darwin had not yet arrived !

Why have not all these forms of life risen simultaneously ? Why did not the tepid and shallow primeval seas swarm with sponges, passing little by little into the stage of polypi, destined in their turn to emerge in due course into the class of amphibia ? Why have not *all* apes become humanized, since so many have succeeded in the ambition ?

The case is the same in the upper, newer strata. The dinotheria and megatheria, mastodons and mammoths, do not develop by degrees out of lower animals, but all these gigantic, strange, and often alarming apparitions, march forth at the word of the Creator "after their kind," and make their exit "after their kind." Inflexible and stubborn in their properties, fixed in characteristics, they comply with no policy of compromise or transformation ; and when they are no longer comfortable die out, resigning to their Maker the function of inventing new orders of living creatures for new conditions of existence.<sup>1</sup>

To this most serious objection of all Darwin had made answer that we should yet find the transitional forms ; in sooth, a bold speech ! But since then the globe has been much more completely ransacked. We have made diggings in the Sahara for water, for coal at Spitzbergen, in Australia for both ; New Zealand, Siberia, Ceylon and South Africa have been explored geologically, and the volume of the earth's crust with its thousands of leaves has been fairly well conned. Everywhere the millions

<sup>1</sup> Cf. Dawson : p. 103. "With the termination of the Cretaceous epoch it appears that most of the *sauria* suddenly made their exit, and we soon find the continents and oceans tenanted by mammals. The theory of a battle for existence is utterly inadequate here."—Prof. Steinmann : *Prorektoratsrede*, 1899. (E.K.S.)



of stamped replicas of the past display many species side by side, *but in no instance progressive transitions from one species to others.*<sup>1</sup> This is recognized not only by Christian scientists, who might be taxed with prepossession in the matter, but also by prominent anti-Christians. We will listen to the voices of a few. It is long since Cuvier drew Lamarck's notice to the fact that for several millenniums the ibis in Egypt had not undergone any change. Bischoff, whom Liebig styles a master in the department of evolution, said in his lecture at Munich on the Darwinian theory that "this movement could not and would not last. The basis on which it was erected, namely the study of nature, must necessarily prove the instrument of its subversion and restriction to that modicum of truth which is in it."<sup>2</sup> Liebig himself declares that "strict scientific research knows nothing of a chain of organisms." And Dubois-Reymond speaks in these cold and almost sarcastic terms of the theory of natural selection:—"We seem to have the sensation in holding to this doctrine of a man hopelessly sinking who is grasping a single plank that keeps him above water."

The opinion of Dr. Müller, the well-known editor of *Natur*, is the same. "It was a great conception of Darwin's," he says, "that of educing all organisms from one another; unhappily, a single glance back at the

When the Lamarckian affirms that all our recent plants and animals were developed out of previous species entirely different, he affirms what, if true, would be capable of proof; if it cannot be proved it is because it is not true."—Hugh Miller, *Test. of the Rocks*, p. 200.

"So long as the theory of metamorphosis is not proved by plain facts, it remains an idle hallucination, undeserving the tribute of admiration paid to it."—Fleischmann, p. 133.

<sup>2</sup> "He is no scientist who has not settled accounts with Darwinism."—Wilser: *Germ. Scientific Cong.* 1897. (E.K.S.)

creatures of the several epochs of creation that have been preserved to us in fossils demolishes this specious hypothesis." Elsewhere he remarks at greater length :—

"We believe that we can know nothing about the origin of species, because it was withdrawn from sensible perception, and because, even if we were content to place ourselves on Darwinian ground, we are never likely to succeed in detecting a new species in the act of emerging from an old one, though we should live to an age of thousands of years. Haeckel, as a Darwinist, recognizes this, when he treats the intervals indispensable to development as infinite.<sup>1</sup> Whereupon sensible perception, the groundwork of all natural science, is put out of court, and we arrive at the not very exhilarating conclusion of Hegel, that 'every phase of philosophy starts from a postulate'; that is to say, from something given, which has to be received without our being able to explain it."<sup>2</sup>

Dr. Kalisch avers that "the immutability of species will only be refuted if its mutability is attested by experimental evidence; but when will such a case occur? Will it ever occur at all? And so with 'natural selection': is proof of the occurrence of this forthcoming in one solitary instance?"<sup>3</sup> Hamann again, so long a pupil and assistant

<sup>1</sup> Besides, this supplementary hypothesis of geological epochs of time proves too much. If, for example, the whole time from the Eocene is absorbed in the small change from Palaeotherium to horse, the same scale would in other cases take us back to the Mesozoic, prior to the placental mammals. Thus changes within the order *ungulata* require from the Tertiary era downwards! Dawson, p. 122. (E.K.S.)

<sup>2</sup> *Die Natur*: Apr. 1888, Jan. 1893.

<sup>3</sup> *Erwiderung gegen Dubois-Reymond über Goethe*. "It is almost impossible," confesses von Wagner, one of the few orthodox Darwinians left in Germany, "to prove the actual working of natural selection in the development of species by particular instances." *Umschau*, 1900. (E.K.S.)

of the Darwinist Haeckel, records it as the verdict of palæontology that single families of animals appear side by side without intermixture, that intervening members are absent, and that transitional links occur only within specific orders, not between tribes or classes.

Once again let us listen to the termination of an article on this question by the famous Genevan materialist, Professor Vogt. "It must suffice here to have pointed out these extremely intricate relationships. Wherever we gaze, the utmost multiplicity meets us in the particular phenomena that are reviewed. Here are animal forms, which, so far as we can discover, have manifested no change for ages, and accommodated themselves to all conditions; there, on the contrary, are others that have run through numerous stages of transformation in the utmost possible variety of detail. Finally, there are yet others, which have become extinct after a longer or shorter period of existence without leaving behind them any visible descendants. Who can reconcile facts like these? One thing, however, plainly follows from the foregoing remarks: the dogma, 'Like formation, like descent,' on which all our phylogenetic studies rest, cannot pretend to universal validity. The *onchidium* with the eyes of a vertebrata is no offspring of a vertebrata, nor the vertebrata of an *onchidium*. The American horse does not descend from that of the Old World, nor the Old World animal from an American ancestor; the South American llama has not a common parentage with the Asiatic camel. Special investigation may or may not solve the riddle in single instances; but even then it will be safer to say that we are not yet prepared to daub over the chinks with an assertion which the next shower will convert to clay!"<sup>1</sup>

In contradiction to the frequently maintained similarity of all embryonic forms, higher as well as lower, Vogt says:

<sup>1</sup> *Die Natur*: March 1889.

"No anatomy or embryology has been able hitherto to afford the slightest hint how the nervous system of the *annelida* could have been changed into the central nervation of the vertebrata; and yet this system is the first thing that displays itself in the embryo of the vertebrata." <sup>1</sup>

Regarding the studies of Hensen concerning the "*plankton*," that minute form of life which is known to fill all oceans, Dr. Müller remarks with admirable succinctness: "These are phases of life, marked by the most transparent and homogeneous conditions of existence possible; so that one would imagine that we should here at length arrive at an understanding of the factors in vital metamorphoses. Yet the path pursued by Darwinism becomes at this point more and more plainly impassable. The more exact our researches, the more sharply is the difference of species defined; indeed many cases formerly considered transitional must be declared to have been misinterpreted in view of recent researches. Nothing seems more hopeless than to seek to assign, according to the Darwinian theory, a reason for the origin and persistence of such an infinitude of species amidst conditions of life so uniform as these."

When I was a child, it was supposed to be matter of demonstration that life could not exist in the depths of the ocean. The enormous pressure, the cold and the darkness there prevalent, settled the question; and even if by some miracle there should be any forms of life, they would be perfectly colourless and blind: for it is light that produces colours. But the investigations of the *Challenger* have shown that these gulfs teem with living creatures of variegated hues and endowed with sight. In this uniform environment, and subjected to a cold, not of 4° C. as used to be supposed, but of -1° or -2° C., and to perpetual

<sup>1</sup> No proposition is more certain to-day than that every cell proceeds from a cell of its own species.—Prof. Hoppe (1903).



gloom, the "primitive cell" has not propagated one unvarying, colourless type; but, in derision of our unwitting science, God has fashioned a multiplicity of living forms and an astounding splendour of colours in the profundities of the ocean. Vain the attempt of the finite mind to circumscribe the power of an infinite, almighty Creator within the trammels of its pigmy intelligence!

As to the descent from apes demanded as a logical consequence by Darwinists, and once paraded with such a flourish of trumpets, the famous anthropologist Quatrefages concluded his comprehensive survey of this point so long since as 1868 in these terms: "Embryology, anatomy, and morphology coincide in showing how far they are astray who teach, conformably with Darwin's notion, the descent of man from the ape." "We have long held," says Dr. Müller, "that between the human mind and that of the ape there is an irreducible gulf that cannot be bridged by any hypothesis of an extinct and vanished intermediary or ancestor. Every organism in the great series exemplifies a single archetypal idea."

Speaking at Frankfurt in August, 1888, Professor Virchow said: "I have nothing to do with the conception that man emerged from an animal; for, as a matter of fact, those links of transition that must have been present, had they actually lived, are not to be found. *The progenitor of man that is sought is not forthcoming.*"<sup>1</sup> "If climate alone,

<sup>1</sup> "No remains of fossil man bear evidence to less perfect erectness of structure than in civilized man, or to any nearer approach to the man-ape in essential characteristics. From the lowest limits in existing man there are all possible gradations up to the highest; while below that limit there is an abrupt fall to the ape-level, in which the cubic capacity of the brain is one half less. If the links ever existed, their annihilation without trace is so extremely improbable that it may be pronounced impossible."—Dana's *Geology*.

"All the genuine remains of the epoch of the Deluge in

as Darwin alleges, had bleached the Germans to blonde and blue-eyed men, how comes it that North America has never produced a fair complexion, though the climate corresponds. And why are there no negroes in Central America and in Asia?" (The Esquimo are notoriously dark-skinned, with raven-black hair.)

It will be seen that celebrated scientists, clear of all taint of Christianity, and to whom as regards prepossessions, evolution should be most welcome, reject it unanimously on the ground of scientifically attested facts. In the light of such facts it will gradually and progressively, like the philosophy of Hegel, be discarded and become a thing of the past, in so far as it assumes to be a theory of creation, and irrespective of the incontestable services rendered by Darwin to science; albeit for a long time to come brought into the field by men who on various grounds would give a good deal to have it true. That ancient creative speech, ten times repeated in the opening chapter of the Bible—"each after its kind"—still stands fast.<sup>1</sup>

Europe, as well as all the skulls found in caves, are of good formation, and coincide perfectly with the present *Homo sapiens*. In no sense do they fill the gap between man and ape."—Zittel, *Handbuch der Paläozoologie*, iv. 718.

"All attempts to discover the line of ascending evolution from animal to man have failed. No *proanthropos* or ape-man exists; the missing link was the creation of a dream."—Virchow: *Report of the Anthropological Congress at Moscow*, 1892 (Vol. xxi. 506).

<sup>1</sup> As will be seen from the opinions already quoted, the sense of disappointment and dissatisfaction in regard to Darwinism has become pronounced in Germany. Any doubt of this that may linger in the mind of the reader should give way before the following additional evidence.

1. At the congress of German Scientists in 1900 the anatomist Hertwig said plainly that "only ontogeny was directly accessible to scientific research." "What is this but a concession that we know nothing definitely about descent of

That is well ; for the natural consequences of the above-named opinion are portentous. If man was a beast once upon a time, he may become bestial again, nay, on species, but we believe in it ? It is a piece of philosophy, not science."—Dennert, *Am Sterbelager des Darwinismus*, 1903.

2. Haeckel has attempted to supply the deficiency of evidence by the formulation of the " biogenetic law " that the ontogeny of an organism is a repetition in miniature of its genealogical history. But, if not abandoned, this " law " is so generally modified and limited (e.g. by Gegenbaur, Steinmann, Hensen, Hertwig, Keibel, Oppel, etc.) that it is of no service to the evolutionary hypothesis (Vid. Fleischmann c. xiv.).

3. Prof Fleischmann (Prof. of Zoology and Comparative Anatomy, Erlangen), in *Die Descendenztheorie* (1901), to which references have already been made, enters into a detailed examination of the " descent of species." He was an evolutionist ; but closer investigation has convinced him that that theory is unfounded in fact. " I go farther," he says, " and affirm that the discussion of the question does not pertain to the domain of strict zoology or botany " (p. 17). After detailing the strongly marked and complicated anatomical divergences between the organic types, which have themselves multiplied much beyond Cuvier's four as research has progressed, he insists that the question shall be judged by no speculative standard, but by the presence or absence of the essential transitional links. In the case of the vertebrata, the fish is the only conceivable primitive type. But it is impossible to trace the arm or leg to the fin of the fish, even when it assumes the peculiar formation of the *ceratodus*. He proceeds to discuss minutely the alleged genealogy of the horse, and evidences that, though plausible when confined to the single consideration of digits, it breaks down in other points. Of the chief transitional link in the pedigree, the *merychippus*, nothing has been found but the teeth ! It is of great importance to observe that " it does not follow from the similarity of single limbs that the other members of an organism must possess the same degree of resemblance " (p. 47). The attempt at a derivation of birds from reptiles is next examined, with special reference to the *archaeopteryx*, which is now classed as a genuine bird by the best authorities, whilst Haeckel's *tocornithes*, the " missing link," is still missing. " If 11,000 living



the theory of Darwin he must do so in altered circumstances, upon the emergence of conditions of life ever more adverse to him, such as the fresh recurrence of an "ice-age," and at varieties tell us nothing about their pedigree, how can fragmentary remains, whose value is much lowered by the scanty preservation of the fleshy parts, enlighten us better ? " (p. 105). Fleischmann also deals with the parentage of the mammals, the articulata, echinoderms, molluscs, fresh-water snails, etc., and the evidence of embryogeny, concluding that "the possibility of settling (scientifically) the primitive history of the animal kingdom, and the future hope of doing so, are frustrated" (p. 251).

In its philosophical use the word "evolution" describes a graduated development from simple to complex forms. The natural scientist has converted this purely abstract idea into an actual genetic process. Exact proof being found impracticable, the principles of rationalism were adopted. Like Descartes, or Spinoza, Darwin, Haeckel, Huxley and Wallace place unlimited confidence in "ideas." They advocate mechanical evolution as the sole alternative of an "unscientific theory" of creation. The question is whether this speculative bias is permissible in natural science, whether a notion is accredited by its own light, or must be rigidly proved first. The inductive method will assuredly hold its own in this dispute.

The logical transformation of the idea "ape" into the idea "man" is no genealogical process. As well might the mathematician who can "evolve" a circle from the conception of a polygonal figure deduce the pedigree of the circle from the polygon. Zoology creates an animal kingdom of logical correlations not perfectly tallying with realities; for creation is more multiplex than our minds will admit. (The subtilty of nature far surpasses that of our senses or understandings.—Bacon, *Nov. Org.* I.) Because the idea of species is somewhat indeterminate, Darwin infers a mobile condition of species themselves: the fact being that the cause of this lies in the limitations of language, the inadequacy of our means of registering facts. He turns relation into blood-relationship. In reality, it is like the analogy of "related" crystals or minerals (c. xvi). (Here is a resurrection of the interminable controversy between Nominalism and Realism!) (E.K.S.)



the best long before the ultimate culmination of the universe. We have already remarked the assertion of Spiller that the last man will live as an equatorial Esquimo. And who can give us any pledge that evolution will not one day of itself step backwards, just as the eccentricity of stellar orbits, augmenting for thousands of years, at length declines again for an equal space; that man will not revert, through all the stages successively attained once more to the primordial cell ere the final dissolution of the solar system ?

At least Professor Yung of Geneva University teaches that agreeably to the merciless law of evolution, in consequence of the advance of industries on the one hand, and of intercommunication on the other, our race will, a thousand years hence, have longer and stronger arms, but shorter and weaker legs, and will thus assume an appearance akin to that of the ape. "It will be known," he says, "as the period of long hands and short feet."

If we care to follow out the issue of this teaching, a singular future of humanity looms before the mind's eye. With an accentuated form of "natural selection," (as must be the case with a progressive evolution) divergent races of men will appear in a few millenniums—hump-backed clowns characterized by enormous arms; thick-pated bookworms to whose small eyes no objects will be visible beyond the distance proper for reading, and with miserably stunted legs; six-handed pianoforte players with groups of tapering fingers; rural postmen consisting almost exclusively of spindle-shanked legs, and porters broader than they are tall, etc. An extraordinary and most deplorable prospect !

But, if changes such as Professor Yung augurs are to be looked for in a thousand years, we cannot help asking how it happens that no new species have "evolved themselves" in several millenniums in India with its rigid caste-system,

or in Egypt where the inheritance of a calling or trade is transmitted from father to son for many generations by a strict process of hereditary selection.

Since the foregoing paragraph was written, the evolutionist and social reformer Clemenceau has spoken plainly in the preface to his book, *La Mêlée Sociale*. "In employing the term evolution we indicate a 'curve'; when the summit is once reached, only a slow or swift descent to an inevitable destruction remains." He proceeds: "The hour of the great revenge of the lower nature on the higher is come. Life that began in a happy crisis of birth will end in paroxysms of misery. But impaired sensibilities and senility will not suffer the human race to feel the full horror of its destiny." The capacity for dreaming, "*le rêve*," is the sole consolation which he presents to mankind!

Thus does every error overshoot itself, and bear within it the seed of its own downfall. The very men who a few years ago proclaimed in jubilation to the world that we were not descended from God but from the ape, now stand disquieted and scared at the consequences of their own doctrine.

The great error of Darwinism is its complete repudiation of the sacredness of individuality as a fundamental law and mainstay of the creation. If this personality is but an outcome of blind influences and forces, without any divine idea as its adamant, imperishable substratum, the universe sinks in value 99 per cent. No wonder that the materialist who, consciously or not, starts with postulates derogatory to nature, bent on reducing it to his own level, greets this soulless system with sympathetic exultation. But though set forth in specious and beguiling masquerade, it was ever at bottom an unsightly object. The belief that God (in Darwin's view) or primordial matter (in the materialist's) deposited a potency of life in

the primitive cell, and then abandoned the poor thing to all the fortuitous contingencies of a random "battle for existence," so that, laboriously wrestling for life, it developed into this or the other existence, according to the stress of wind and weather, heat or cold, drought or moisture, dearth or plenty which it encountered ; that a giraffe, for instance, was forced to strain its legs and neck, to preserve its life, till during an accidental pressure of drought it reached its present shape ; this doctrine of a chaos of possibilities, accidents and efforts has never fascinated us, and if it were true we could only deplore the fact ; for its intellectual fruits are disastrous.

Had God not established species as a stable and fixed ordinance, and had organic life fluctuated in vacillating, kaleidoscopic, constantly interchanging forms, it would have been as unwholesome for our minds as if day and night, weeks, months and years, summer and winter, and the size and weight of the globe had been inconstant, shifting magnitudes. Our power of reflection and mental existence depend directly and unavoidably on the objective units of the creation. Divest species of this fixity, and the substantive or *nomen*, the rock on which language, and therefore all our cogitations are built, reels and crumbles instantly. Then we should have mere accidents instead of substances ; and the immediate sequel is that the temporary phenomenon would gradually change places with the essence or *noumenon*, and substantive and adjective, merged in each other, become indistinguishable. By the uncertainty and treacherousness of definition of specific phenomena, language would be rendered altogether unstable, fluid, obtuse and slipshod, just as children and uneducated people speak of everything that they do not clearly grasp as a "thing" ; and the inevitable consequence would be an indeterminate, hazy, more and more vacant condition of our entire reflective and moral faculties.

The indestructibility of species is an essential condition of sound mental development. Their interchangeability involves the ruin of the human intellect.<sup>1</sup>

The marvel would not be that an animal should supply itself with horns or a shaggy tail ; indeed, that is rather natural to the mind of a materialist, who fancies that oxen butt because they have horns. But to him who believes that it was the divine breath that turned a clod of earth into a man, and that the body is still only the visible instrument of a soul which tenants it and acquires both eyes to see with, as it needs them, and horns for pushing, and claws for scratching,<sup>2</sup> the question is not whether the body, but whether the soul, the vital principle within, with its properties, instincts, characteristics and outstanding traits, can so transmute itself that in time a rose might become a stinging-nettle, a louse a bee or an ant, a lamb a hyæna, a turtle-dove a vulture, or (what is the same thing) the soul of a rat inhabit a nightingale, or that of a swallow a rattlesnake, or a toad frequent the frame of a butterfly, or a lamb that of a tiger. What then is the soul to the evolutionist ? Only a characterless, formless, inanimate protoplasm, a substratum almost eluding definition. Here all distinctions of good and evil, clean and unclean creatures, and of superior and inferior endowments, disappear ; in other words all distinctive qualities are but

<sup>1</sup> In this aspect Darwinism recalls the Pythagorean metempsychosis, as described by Ovid.

“ Nihil est toto quod perstet in orbe :  
Cuncta fluunt omnisque vagans formatur imago.  
Haec quoque non perstant quae nos elementa vocamus :  
Nec species sua cuique manet, rerumque novatrix  
Ex aliis alias reparat natura figuras.”

—*Met.* XV. 178 sq. (E.K.S.)

<sup>2</sup> “ For of the soul the body form doth take.”—Edmund Spenser : *Hymn in Honour of Beauty*. (E.K.S.)



constantly emerging and vanishing wavelets of an ocean of "unconscious consciousness,"<sup>1</sup> having no permanent, and therefore no intrinsic value. Such a philosophy, logically pursued, denies the persistence of the individual, and consequently the soul's immortality. Yet it was when God had created everything "*after its kind*" that He looked and pronounced "*that it was good.*"

The Christian cannot be expected to mourn over the rapid decline of this theory. For the assumption that all things are in "a state of flux," volatile, transitional, ductile, has wrought incalculable mischief. When we hear the assertion that the criminal cannot help being what he is; that it is due to heredity, or the presence of a little more or less phosphorus in his cerebellum; that we have no right to punish him for his acts—these are corollaries from Darwinism. When Socialists vociferate that the weakest must be thrust to the wall; that acts of humanity are a pernicious conservation of waste products or useless members of society: that the sooner these perish, the better—that is consistent Darwinism. When celebrated professors and metaphysicians assure us that there are no unchangeable principles of right and wrong: that the elements of morality form a mutable code; when one of them goes so far as to proclaim that "all obedience is inherently immoral"—that is evolutionary philosophy. If "advanced theologians" announce to us that dogmas and canons of Scripture are a survival of the past which no longer need trouble us, and that the Bible is an Oriental book affording no solution of the queries which "modern thought" propounds—that is Darwinistic theology. But we hear many cultured minds protesting with virtuous indignation that "a belief in evolution can be combined with Christianity." Yes, no doubt, it can, if one is content to be

<sup>1</sup> The old *ῥεῖ τὰ πάντα* revived.

half an evolutionist and half a Christian. Nevertheless, in spiritual things two halves make no whole !

The frequently prophesied "entropy" likewise, or gradual extinction and dissolution of the universe, turns upon a partial and capricious interpretation of certain facts. Undoubtedly we see that there are various classes of suns in the sky : some which, like Sirius, Vega and Regulus glisten with white light ; others, such as our sun, Capella and Pollux, that shine with a yellow, and yet others with a reddish lustre. We infer from observations, such as the fact that the last class contains suns of wider variability than the rest (and with much likelihood), that these red suns were once yellow and still earlier white, but are now in process of extinction, and ascribe their considerable variations partly, at any rate, to a gradual deposition of slag on their surfaces. But to conclude from this that all the suns in the sky were once white and that all, ours not excluded, will one day be red and reduced in heat, and to deduce a final obscuration and frigidity, a kind of death from dotage of the universe, is another interpretation put upon facts beyond that which they will bear, and all in favour of a theory. The thought implies moreover either the non-existence of a deity, or the blasphemy that the Creator will by degrees become unequal to the maintenance of His universe or employment of His estate ; in short become "insolvent."

According to Flammarion, no brilliant star that appeared in the catalogue of Ptolemy has been extinguished. Although seven stars have expired, been quenched, or have disappeared recently from the sky, thirteen fresh stars have appeared or been born instead of them : if many have grown a trifle ruddier, others have become more white. The beautiful star Capella looked red to Ptolemy ; now it is a yellowish white, and has increased

so much in brilliancy that it outshines Vega. No. 6 in Perseus has turned from red to white in the brief space of forty years, and the double star, 96 in Hercules, which was formerly green and red, is now white. Above all, in Sirius, that monstrous sun which probably excels our sun five thousand times in lustre, we have, according to the plain, coinciding testimony of Cicero, Horace and Seneca, a striking example of a sun once red (redder than Mars) but now a dazzling white.<sup>1</sup> Its light and heat have therefore augmented certainly several hundred times from unknown causes in a very short interval, for what are two thousand years in the stellar heavens and in relation to such vast worlds? In all likelihood an equal enhancement of vitality, energy and splendour as regards its satellites or planets, accompanied this change. All suns consequently are not waning in light and heat, but many, perhaps the majority, are accumulating their store of both, although we know neither how nor why.

So the ultimate "entropy" of the universe is not contained in the facts, but is an arbitrary construction put upon certain of those facts, which seems to many to be plausible. Relying upon other facts, we might retort upon the "entropist" with equal justice that the universe is not approaching the melancholy end of congelation, but advancing by accessions of force, light and heat to an even more glorious fulness of life. Yet that, too, would be a precipitate assertion beyond the evidence of ascertained facts, considering the short time during which we have made observations of the stellar world.

Let us learn then to discriminate between a thing and

<sup>1</sup> "Namque pedes subter *rutilo* cum lumine claret  
Fervidus ille Canis."—Cic. *Arat.* 348, 349.

"*Rubra* Canicula."—Hor. *Sat.* ii. 5, 39.

"Acrior Caniculæ *rubor*, Martis remissior."—Sen. *Nat. Qu.*  
i. 1, 7. (E.K.S.).

its explanation, honouring indubitable facts, but scrutinizing closely the elucidation offered. Where such presents itself and is consistent, intelligible and as far as may be coincident with the facts (for it is never completely so) we should receive it gratefully, but be shy of the present day mania for explanations. Why not in many cases when asked "How do you explain this?" answer honestly: "I cannot explain it at all; I study the facts and wait patiently." The greater the scientist, the better is he aware how little there is that we can in reality explain.

#### IV.—FANCIED ANTAGONISM BETWEEN MIRACLE AND SCIENCE

In the third place this repugnance to natural science on the part of many Christians rests upon a too one-sided view of that great truth that God is no respecter of persons, and that He endues many who are insignificant and "babes in grace" with His Holy Spirit no less than the learned and wise of this world. We do not wish to detract one iota from that utterance of Christ's—"I praise Thee, O Father, Lord of heaven and earth, because Thou hast hid these things<sup>1</sup> from the wise and prudent, and hast revealed them unto babes"; but we earnestly entreat the reader to reflect that in order to fulfil His great purposes in history God did not choose commonplace men, oblivious of human knowledge and science, but honoured with His personal friendship and immediate converse and assigned the writing of His Word to those who, like Abraham, were princes of their people and trafficked with kings, or, like Moses, were skilled in all the learning of the Egyptians; men like Job, whose speech redounds with the profoundest understanding of nature and of man; David, the hymnist of incomparable anthems and odes

<sup>1</sup> i.e. that Jesus Christ is the only begotten Son of God. See the context, Matt. xi. 25-7, Luke x. 21, 22.



touching creation ; and Solomon, who “ spake three thousand proverbs, and whose songs were a thousand and five. And he spake of trees from the cedar tree that is in Lebanon even unto the hyssop that springeth out of the wall ; he spake also of beasts and of fowl and of creeping things and of fishes.” <sup>1</sup> Of Daniel it is recorded that he “ was preferred above the presidents and princes because there was a higher spirit in him ; therefore the king thought to set him over the whole realm.” <sup>2</sup> When Christ speaks of “ the wise ” in the passage cited above it is clear that He means the wise of this world who deem themselves wise ; but that He does not refer to men versed in God’s wisdom is manifest from the fact that it is not only shepherds, but also wise men from the East who come to worship Him.<sup>3</sup> Lastly, God chose, before all the apostles, Paul, a man learned in the wisdom of the scribes, to preach the Gospel among the Gentiles, and to labour “ more than they all.” And in like manner we see that the divinely selected leaders of Christianity since then, the true “ princes of the Church ” and spiritual shepherds of men, the Fathers and Reformers, Augustine, Luther, Calvin and the rest, were by no means unscholarly, ignorant men, but rather of such versatility of mind that, in the language of the Roman poet, they esteemed nothing foreign to them that concerned mankind. If they were alive to-day, it might confidently be expected of them that, as we have already indicated in the case of Luther, they would avail themselves of natural science in order to proclaim the more articulately and signally their faith in a

<sup>1</sup> 1 Kings iv. 32, 33.

<sup>2</sup> Dan. vi. 3.

<sup>3</sup> They brought Him gold as King, incense as the Lord’s Anointed, and myrrh in prefiguration of His bitter sufferings, which they foresaw : for their eyes beheld more and greater signs in the stars than are to be found in Laplace’s *Mécanique Céleste*.

great and all-wise Creator of the universe ; as also the infidel on his part uses it in order to promulgate the atheism that has its root, not in the object of his study, but in himself.

Let us beware of carrying to an extreme the distinction between the various operations of the Spirit of God, in other words between the inward and external life, as if they stood in opposition to each other. A serious study of nature in the exercise of God-given senses and capacities divinely implanted does not lead astray from Him, does not enervate faith, nor cloud the inner eye ; but he in whose heart God and nature are themes attuned to unison, and who praises God daily for that, is no longer fretted by the wranglings and jars of men of science, albeit he is nothing loth to confess that there is very much which he fails to comprehend. Wherever he goes, the infinite power and love of God environ him : in air and wind, in spring and brook and sea, in stone and plant and beast he perceives the imprint of divine thoughts, in which he rejoices to recognize with his purblind eyes even now something of the glory of his God ; and exults in the anticipation of visiting shortly the true universe, where essential light and matter, life and energy, and a true concatenation of all beings and forms constitute a true, imperishable creation, to search into which will be our occupation even yonder, and to praise God to eternity for its splendours.

The same defect of judgment contributes to heighten in many minds the fancied antagonism between science and miracle, which to numerous Christians is so serious a difficulty. They hear continually that science has established the truth that " natural law " is everywhere regnant, and that the hypothesis of the supernatural is superfluous. It is true there is a short path to full assurance ; " God gives His Holy Spirit to those that ask Him " ; and the soul

enlightened by the Spirit, in so far as it partakes of that celestial light, has no need to "study the question" before believing, any more than I require to learn astronomy to know that the sun shines. But sometimes clouds will obscure the solar disc; the soul has its seasons of eclipse; and there are many whom God does not shield from long conflicts with doubt, and who have to cry sometimes with joy, sometimes with tears: "Lord, I believe; help thou mine unbelief!" For their sakes we must not omit to deal with this question.

We are in the habit of describing as "natural" everything that occurs with regularity, even though we may not comprehend its mechanism in the slightest. If a thing falls out once in a thousand years, it is questionable; if it has never been known to happen, it is incredible. But the identification of the "natural" with frequency of occurrence is a mental fallacy. No doubt the presence of the manna was no more surprising to the young Israelites who had been born in the wilderness than the sight of the morning dew to us: they had never known it otherwise. That an event has not happened during our infinitesimal experience is no proof that it will not happen in the future.

But many people who grant that this is a false criterion of what is "natural" apply the term to occurrences conformable to fixed laws, recurring under suitable conditions, and discredit all that contravenes these. That sounds better and more plausible. For it is easier to admit the supernatural in the abstract than to believe in specific miracles; the former is theory, the latter practice. Thousands who would not dispute that God created the world once upon a time would hotly contest the statement that He formed a grain of seed yesterday (as if He did not create thousands of living souls every day); and many who acknowledge a Supreme Being would smile with pity if I told them that He had heard my prayer this morning.



The *theory* of the supernatural is almost "philosophical," but the allegation of miracles is alarming. Think of the consequences of such an admission!

What then is a miracle? It is something that we do not understand, because it transcends our experience, and lies beyond the scope of the laws of nature so far ascertained by us, whether it be regarded as occurring in conformity with higher laws or ascribed to an authoritative divine intervention paramount to all law. Two consequences follow from this simple statement and definition of miracle, which is contained in the very word.

1. The absurdity of denying its possibility. To assert that miracles are impossible and can never have taken place is tantamount to saying that we know all forces, laws and potentialities in the universe. In six thousand years we have so accurately noted and so exhaustively studied every single fact, as well in the life of the individual as of nations, and every phenomenon of nature, or rather of the universe, that we can ordain what is possible<sup>1</sup> and

<sup>1</sup> "Those who with one voice denied the existence of aerolites, and summarily dismissed all the alleged facts as a silly fable, because it contradicted their experience; those who refused to admit the Copernican theory, because, as they said, it manifestly contradicted theirs; the schoolboy who refuses to admit the first law of motion, because it gives the lie to all his experience; the Oriental prince (whose scepticism Hume vainly attempts on his principle to meet) who denied the possibility of ice, because it contradicted his experience; and the men who, with Strauss [and Harnack]\* lay down the dictum that a miracle is impossible, because it contradicts their experience, have all alike fallen into one of the most ordinary illusions (the *idolon tribus*) against which Bacon has warned us, namely, that that cannot be true which seems in contradiction to our *own* experience."—Henry Rogers: *Essays*, vol. iii. 215.

---

\* Vide Harnack's *Wesen des Christentums*, though he veils his meaning under equivocal expressions. But his Deism necessitates a very loose regard to the testimony of the New Testament. (E.K.S.)



what not. Moreover, we are able after this brief span of time to draw infallible conclusions about all that has befallen or ever will befall, and we know that nothing that is inexplicable exists. Who does not see what monstrous presumption breathes through these propositions? For as even Maudsley remarks: "It is the arrogance of human ignorance to imagine a thing is impossible because it seems to us incomprehensible." Science is not, and never will be, in a position to lay down infallibly what can and cannot be. The possibility, then, of miracles as events phenomenal, but to us unfathomable, cannot be denied. The old dispute whether they happen by virtue of a higher law of nature beyond our ken or of an immediate dispensation of God is an otiose speculation as far as we are concerned. For we admit of no "laws of nature," once devised by Him, but which thenceforward act automatically, like a clock constructed and wound up once for all. But what we, for the sake of brevity, style in common parlance the "forces of nature" is at bottom nothing but the unimpeded efflux of the forces or force of the Godhead, and in the final resort an efflux of that will of which the heavenly host sings in the Apocalypse: "Through Thy pleasure they have their being!"<sup>1</sup> Did it please Him at this moment to withdraw Himself into His uncreated essence, even as He was before creation, the universe would evaporate in that same pulsation, and all natural forces cease to be. For they are not entities or self-existent: there is but one *Causa causarum*. Inasmuch that there is for us nothing purely natural, but only a something that is "divine," and we might equally well say, not that "there are no miracles," but that every several phenomenon of existence is a miracle from this point of view.

<sup>1</sup> The Greek is *διὰ τὸ θέλημά σου ᾔσαν καὶ ἐκτίσθησαν*—Rev. iv. 11. (E.K.S.)

But many, whilst conceding that there are countless secrets in nature, distinguish between these *provisional* mysteries and miracles, which stand in contradiction to "natural law." The distinction, however, is untenable; for in order to determine what really accords with "natural laws," we must first be acquainted with every one of them. Is this the case? Why, rigorously speaking, we do not know *one* law of nature, but only a clause or two out of it, by the light of which we hazard our incomplete expressions of its full tenour. The exact formula must include all possible past and future factors and corollaries of the law, in every relation of space, time and number! The accidental discovery of the Röntgen and Becquerel rays has shown our ignorance of the true law of light. We deemed ourselves on safe ground in maintaining that the human body and metals were impermeable by light, a hypothesis diametrically contrary to the truth. And our present theory, as Babinet well remarks, does not even serve to explain the sharply defined shadows which objects cast. Similarly, a new school of physicists repudiates attraction, and explains its phenomena by the "pressure of the ether."

The incomprehensible must of necessity seem to stand in antagonism to the known, just as the invention of the telephone and of daguerrotypes was at the time treated by the scientific world as an imposture. Had the Bible told us that the prophet Elisha beheld the inner organs of Naaman through his armour, or that Paul had announced the material composition of the polar star by means of its appearance, our "Higher Critics" would have flatly scouted the narrative of this "absurd miracle"—before, that is, the discovery of Röntgen rays and spectrum analysis! Had we never known a magnet, everybody would laugh at the "traveller's idle tale" that he had met with a stone in Central Africa which set metallic bodies in

motion at a considerable distance. The distinction between the natural and miraculous, though practically convenient and unavoidable, is consequent upon the relativity of human life and the imperfection of human language ;<sup>1</sup> just as we are all obliged to live in obedience to the law of perspective, although aware that it is a subjective illusion.

2. The second consequence of the above definition of miracle is the impossibility of combating the same with scientific weapons. Miracle absolutely eludes scientific appraisalment. Professor Tyndall, himself no believer in revelation, has expressly admitted that. "It is self-evident," he says, "that if there is a God, He is almighty, and therefore can perform miracles ; but science has nothing to do with miracles, because, supposing their existence, they lie outside its proof." "Quite right !" we answer, and would recommend many scientists of the tenth or twelfth rank to take this dictum of a scientist of the first rank to heart ; for they are never tired of endeavouring to combat the miraculous with the artillery of science, which is about as reasonable as shooting at the sun with revolvers or "quick-firing" guns, with the asseveration that if only the mechanism were perfected, they should soon bring it down ! But the essence of miracle is precisely its unassailability by principles of proof and reasoning, its incomprehensibility and indemonstrability. The man who seeks to comprehend and explain any miracle, and to adjust or figure to the understanding such an outflashing in our world of the unfathomable divine omnipresence, manifests thereby his ignorance of its very nature, and accordingly blunders, as a rule, in his attempt not only from a Christian, but also from a scientific point of view. A miracle scientifically demonstrated and elucidated would be a flat contra-

<sup>1</sup> "Portentum non fit contra naturam, sed contra quam est nota naturam."—Augustine : *Civitas Dei*, xxi. 8. (E.K.S.)



diction. No advance in zoology will ever enable us to prove that Balaam's ass did not speak, nor any development of physics, however profound, that the three men in the fiery furnace were burnt, or that Christ must have sunk when He walked on the sea. For what child does not know that these things did not happen by course of nature? He must have a singularly confused brain who permits himself to be argued out of his belief in the miraculous, or even shaken, by alleged "scientific" arguments, and would be well advised first of all to probe his conception of an *Almighty* Being, and find out what he means by it. The chief miracle is God Himself, and disbelief in miracle is disbelief in Him; even when a man believes that he believes in Him—in other words, when his mind is too weak to embrace both beliefs at one time.<sup>1</sup> Miracle cannot be grasped by

<sup>1</sup> A "miracle is an effect that indicates the presence of a Power of a higher order than those which we are accustomed daily to trace in phenomena, but a Power whose ever-present existence it is only atheism that denies."—Dr. Thomas Brown: *Cause and Effect*.

"The miraculous and the transcendent is the very nature of God. It is as easy to believe in a miracle issuing from Him as in any operation according to the laws of nature (which, after all, is possibly in many points only the nature of our planet): it is as easy, because either mode of action is indifferent to Him. All the theist wants is a sufficient motive for such transcendent agencies; but this is supplied in excess by the case of a religion that was to revolutionize the moral nature of man. The objects of the Christian revelation were equal at the least to those of the original creation: the *epigenesis* was at least as grand an occasion as the *genesis*."—De Quincey: *Miracles as Subjects of Testimony*, vii. 244-6.

It is remarkable how clearly the principle that all things are possible to a divine agent appears to have been inwrought into the staple of Greek thought. It is almost a commonplace of the poets. Not to mention Sophocles (γένοιτο μὲν τὰν πᾶν θεοῦ τεχνούμενον, *Aj.* 86), we need only refer to Pindar and the recently recovered text of Bacchylides for examples: e.g.—



the intellect, any more than a sunbeam can be seized by the hand ; it must be beheld by the spiritual vision ; and so in all ages narrow understandings have been prone to deride the miraculous, because it transcends their horizon, whilst great men and deeper thinkers have at all times and in all nations believed in it. Whence the German proverb that " all great men are superstitious." <sup>1</sup>

The gist of the matter, then, is not whether one can believe such and such an instance—the translation of Elijah, or the walking of Christ upon the waves. A miracle is as little susceptible of explanation as existence : it either *is* or *is not*. But if it is a fact that something may befall to-day or to-morrow that conflicts with my fragmentary experience and meagre knowledge of the statutes of the universe, nay runs counter, or seems to run counter, to them, then at one stroke all miracles are possible, yesterday, to-day or to-morrow, all alike ; whether it be the suspension of the sun's apparent course in the sky, without any displacement of the solar system, or a child's finding, in answer to his prayer, a farthing in the dust of the roadside ! We who are theists are *a priori* believers in miracle : for a God compelled to conform to any of the " laws of

ἔμοι δὲ θανμάσαι  
θεῶν τελεσάντων οὐδέν ποτε φαίνεται  
ἔμμεν ἄπιστον.—Pind. : *Pyth.*, x. 48-50.

τελεῖ δὲ θεῶν δύναμις καὶ τὰν παρ' ὄρκον καὶ  
παρὰ φελπίδα κούφαν κτίσιν.—*Olymp.* xiii. 83.

ἄπιστον ὅτι δαίμονες  
λῶσιν οὐδὲν φρενοάrais βροτοῖς.—Bacchyl : xvii. 117.

Cf. Milton :—

" As if they would confine the Interminable,  
And tie Him to His own prescript  
Who made our laws to bind us, not Himself."

—*Samson Agon.* 307-9. (E.K.S.)

<sup>1</sup> Alle grossen Männer sind abergläubisch.

nature " which He had Himself adjusted, in respect of the manner or measure of His self-revelation in creation, would no longer be such. Is it not oftentimes seen, even among men, that where petty and feeble minds can perceive only one sole resource, or possibly none at all, a man of genius will hit on a dozen serviceable expedients or courses of action as if in sport? Man indeed has but one best way: God an infinite number, because He is the infinitely Good.

Yet miracles are never wrought capriciously. Directed to a fixed end and governed by a law, they occur conformably to natural principles and analogies, not like the haphazard wonders of a fairy tale.<sup>1</sup> We do not read of organic leaves being changed into inorganic gold, nor of those drops of blood that fell from the Saviour's brow in Gethsemane being converted into precious stones, or of human beings turned into brutes. The barren fig-tree is not consumed by fire: it withers. It is a pity that not only sceptics, but many Christian people cling to a confused notion that a miracle is a kind of ultimatum or defiance to science, and to be accepted unintelligently: whereas it is perfectly compatible with scientific principles. Eternal realities, far from presenting a chaos of anarchical licence, obey laws at once stricter and freer than ours.

Many people again do not see their necessity. Certainly, God has no need of them; nor does He perform them for His own sake; for to Him no events are miraculous, whether it be the creation of new suns, or the generation of a worm by His decree. It is for our sakes that miracles are wrought, lest we should worship God as nature, or nature

<sup>1</sup> Miracles are not causeless; but "phenomena occurring by virtue of an adequate counteracting cause" (Mill: *Logic*, ii. 186). The principle of causation is an intuitive belief, but it does not demand a cause in the physical realm, provided that there is a First Cause, or one independent of "nature," which (of those who admit a deity at all) none but Spinoza and his school dispute. (E.K.S.)

as God. They are wrought to authenticate His diversity from and sovereignty over nature, and to proclaim to all who are not spiritually blind that He is in nature, but that nature is other than Deity; that He is its Author, and that what He has fashioned at His good pleasure, He can at any time at His pleasure undo. Miracles are wrought for "signs," as the Bible invariably terms them. That is their *rationale*, and at the same time a token of the penury of unbelief.<sup>1</sup> "Unless ye see signs and wonders, ye will not believe." And because a miracle presents God to us in His omnipresence, ready to intervene for His own glory, the succour of His people, and not seldom for the judgment of unbelievers, there is no fact or phenomenon against which the devil battles so vehemently as these divine marvels, although, with characteristic duplicity, he permits his devotees to believe in the clumsiest miracles of spiritualistic exorcism and legerdemain.

For men do not escape the miraculous, however far in space and time they may relegate it; even the materialist believes in it, sworn enemy to the supernatural though he be. Not indeed in those which occurred 1,800 years ago, and were confirmed by the testimony of many credible witnesses, numbers of whom joyfully laid down their lives for the truth of that testimony; but, forsooth, in others which are alleged to have happened millions of years back, and were observed by no eye-witness who could accredit their genuineness. To avoid believing in creation he believes in an unattested spontaneous generation, or imports germs of life at great expense from unknown worlds. He cannot believe that Christ raised a man from the grave, in other words, requickenened an organism that had already been alive; but then he does believe, to be sure, that organisms were once upon a time generated out of a concourse of atoms. That God should have, for a specific

<sup>1</sup> Germ. Armutszeugnis: lit. "certificate of poverty."

end, opened the mouth of an ass to speak a few words he will never credit ; but that an ape, one fine day, began little by little to speak without knowing why, and acquired a human larynx—that he can easily accept ! It seems to him an insipid myth that the Creator both of fire and mankind should have made three men fire-proof for a few moments : yet he complacently believes that organic bioplasms retained their germinancy, enveloped in an igneous cloud, or imbedded in molten granite, for millions of years. Indeed a scientist like Tyndall contrives to hold that all the seeds of life, “emotion, intellect, will, and all their phenomena were once latent in a fiery cloud.” A most astounding miracle that ! <sup>1</sup>

The origination of the universe is in any case miraculous.<sup>2</sup> Whether the Almighty fashioned each midge or elephant afresh, or whether He once for all fashioned a primordial cell pregnant with all germs of evolution and destined under the influence of seasons and surroundings, themselves also His handiwork, to attain its present expansion, the quantum of miracle remains identical, in both cases comprising nothing less than the origination of all collective organisms.<sup>3</sup> It is not therefore the belief in the miraculous,

<sup>1</sup> “Incrédules les plus crédules. Ils croient les miracles de Vespasien pour ne pas croire ceux de Moïse.”—Pascal : *Pensées*, xvii. 120. (E.K.S.)

<sup>2</sup> “To create nature is as great a miracle as to contradict or transcend her.”—Sir Thomas Browne : *Religio Medici*, Sect. 27. (E.K.S.)

<sup>3</sup> The fact is that if the assumption generalized into a “law” of uniformity, that our experience may be taken as the criterion of all experience, be correct, the principle ought to be applicable to all eventualities, irrespective of time. In other words, as is argued in “*The Eclipse of Faith*,” creation is excluded (for *Alles Entstehen ist Wunder*), and there never has been a period when the present order was non-existent. This argument is by no means evaded by theories of evolution, because these necessarily presume many a *nisus* of development



but in personal identity and immortality and the testimony of Scripture, palaeontology and other sciences, that stands in the way of our accepting evolution. But even if we were

when something grew into something else. "The infraction of established sequences ceases to be miraculous, if the wonder is perpetuated and sufficiently multiplied!" But, unless the "law" be of universal validity, it is of no force as against occurrences which are by their nature exceptional.

The same writer has argued with much acuteness that the principle of uniformity is applicable to mental as well as physical evidence: indeed Hume asserts as much. On this ground it may be contended that such a falsification of testimony (without detection) as must be supposed by those who reject the New Testament miracles is as miraculous and "unnatural" as a miracle itself. Moreover, as Butler and many later writers have affirmed, these miracles are a part of the true explanation of the rise and speedy prevalence of Christianity, which cannot be accounted for on any "natural" grounds. The moral paradox, considering the purity of the doctrines thus (*ex. hyp.*) unscrupulously propagated, is equally flagrant and irreconcilable with reason.

The question of the *communicability* of miracles, which has been so largely canvassed, does not fall to be discussed here. Mill was fair enough to admit that "the evidence of the senses could prove a supernatural fact as it can prove other things." (*Essay on Theism*, p. 217.) Voltaire's extravagant paradox that "cent mille hommes qui ont vu ressusciter un mort pourraient bien être cent mille hommes qui auraient la berlue" is a mere caricature upon human nature. It proves too much, and would imply that if God wrought a miracle to convince the sceptic, it is impossible that He should succeed in doing so. The fact is incontrovertible that the major part of our beliefs are derived from the acceptance of credible testimony, oral or historically delivered to us, in lieu of personal observation. A certain degree and consensus of evidence alone is requisite for the authentication of a miraculous narrative, especially when interwoven with a history of transcendent moral significance. The mathematician Babbage has even expressed in terms of the law of probabilities the amount of testimony competent to establish a miracle. (E.K.S.)

ready to accede to it, nothing would be gained. For if God once created such a cell, He can create such another at any time, that is, He can work a miracle. And if one, why not a hundred, a thousand, a million? In that case—for the element of time cannot condition His omnipotence—He can instantaneously create as many as are requisite for the reawakening of a dead man to life, or for the future resurrection of the body: miracle again! It would be safer flatly to deny the divine existence, and affirm that the primordial cell was self-created. But alas! here again is something as near akin to a miracle as “one pea is like another.”

We finite creatures float in an expanse of infinity: but infinity is inscrutable to a finite intelligence, incapable of conception or apprehension by ratiocination. Whether we betake ourselves to eternal matter or make our ambush in eternal darkness, miracle will still stare us in the face, an image of the Omnipresent from which we would fain make our escape, but cannot.

The immanent inextinguishable attraction of the marvellous, the blended shuddering and fascination attendant on fairy tales, to which no one is a stranger, are a token that the marvellous exists. It is in correspondence with the tacit longings and aspirations of the soul, and a belief in it is shared by the vast majority of the human family.<sup>1</sup> It is probably more widespread to-day than at the close of the eighteenth century, when Frederic the Great, Catherine of Russia, and Joseph II. welcomed the scoffs of Voltaire and Diderot. But, just as in our childhood's

<sup>1</sup> Does not uniform experience show that the belief in miracles is the normal condition of mankind? It appears then that they will always be believed; for if not, the fact would prove the possibility of miracles by contradicting a deduction from uniform experience.—Rogers: *Eclipse of Faith*, p. 280. (E.K.S.).

stories the king's son who has been purloined and reared as a swineherd laughs incredulously when told of the might and riches of his father and the greatness of his own destiny, so there are many who live in a state of such moral imbecility and prostration that they greet the very mention of miracle with a supercilious smile, and treat it as a mere imposture, because they are no longer capable of rising above the plane of their daily life. Yet every divine miracle—there are Satanic—is a spiritualization of matter, an emancipation from the shackles of so-called "natural law," an instantaneous translation into the eternal order, an emanation from and confirmation of a higher, more perfect, richer, freer world. Thus it was when Christ walked on the sea, raised the dead and healed the diseased. Man was created to be superior to the forces and elements, *not* to die, *nor* to be sick.

To the sneer of others that it does not sustain the light of science we reply: No doubt! As the delicate tendrils on which the vitality of the plant depends, perform their functions only in the depth of the earth; in solitude and darkness extracting life from dead matter: as the human heart, closeted within the breast, distributes the vital force unweariedly through the whole body; and as both of them, laid bare on the dissecting-table, forthwith suspend their motions, and refuse to betray their secret: so the miraculous, which has its lodging in the innermost recesses of the soul, grows reticent before the gaping multitude, and demands faith from him who works and him who beholds it. "He could not do many mighty works there because of their unbelief." That is to say, He could only have wrought miracles of judgment there; and Christ's first coming was not to judge the world. All sincere longing is an attractive principle: all hostility crippling or blasting, by the imperishable laws of the spirit. What orator, poet or artist does not know that he is either



paralyzed by the frigidity and ridicule of the mass of hearers or lookers on, or inflamed, invigorated, and spurred to the greatest achievements by their sympathy? The mighty, believing prayer of the children of God mounts up to heaven, and sets in motion divine forces, and draws down answers, spurning all curbs and fences of the calculating reason; a thing at least as unintelligible to the doubter as sunlight and colour to the blind. For, in common with all august and glorious things, miracle requires a peculiar sensibility for its perception. He who draws near to the Father of spirits with confession of sin, self-surrender, and prevalent, instant, supplication, is borne little by little upward to that region where miracle has its home; whilst the man who constantly fixes his gaze on the earth, seeking only pelf, property and pleasure, dulls his vision for higher things; the sensibility for them, the spiritual eyesight shrinks, and at last suffers total eclipse, till finally he surmises in all that is greatest and deepest, truest and noblest, nothing save deception and fraud. A terrible retribution!

To reject miracles is obviously to repudiate the Bible. A biography of Christ omitting His wonderful works would resemble a life of Alexander or Cæsar without their feats of arms. The attempts to eliminate them from Scripture by forced explanations or depreciation of their moral value do not deserve notice. Either the writers believed in them or not. If they did, then (*ex hyp.*) they were simpletons, who, not once or twice in puzzling circumstances, but on every possible occasion, viewed the plainest occurrences as supernatural. Whereupon there can be no further question of their inspiration. To ascribe these legends to the Spirit of God is blasphemous: and the Bible is a collection of poetical fables and traditions steeped, unhappily, in crass superstition, and, apart from a handful of superior moral essays, of "merely historical interest." But if they



did not believe their stories, and deliberately distorted the facts into a species of "Arabian Nights," under which certain symbolical teaching lay couched, the case is more serious than ever. For the Bible professes to be a book not mainly for the learned or even the educated classes, but for the human race; and that includes millions of unlettered men and women, and millions more of children, half of whom die prematurely. To narrate spurious miracles with an esoteric meaning in a tone of the most heartfelt conviction to these innocent and simple-minded souls, who honestly believe what is solemnly averred to them, is an act of vulgar deception. Such are some of the inevitable consequences of a rejection of miracles.

The question has been mooted of late "whether a belief in them is an essential part of our religion?" A strange query, truly. For there is a previous point to be settled by every thoughtful man and Christian—whether there *are* miracles or not, the answer to which ought to decide the matter.

Bu tour age has a remarkable *penchant* for trimming; a wonderful predilection for the region of half-lights and half-truths. It prefers phrases which do not "commit" the speaker: "broad-mindedness," "deep religious tone," "advancing conception," "liberal school of thought," etc.—these are its shibboleths. However, as it dotes on being practical, and judges very largely by utilitarian standards, we will for once adopt the same ground; and reply that a belief in miracles *is* quite superfluous for all those people who live wholly for this world, whose ideal is to amass wealth for self-gratification, and to be foolhardily reckless as to what may become of them after death. Indeed, in their case, it is to be deprecated; for, agreeably to their debauched taste, it soon warps to sottish and degrading superstitions; never to sit down to a meal where the guests are thirteen; to dabble in

table-turning, hypnotism, clairvoyance, thought-reading *et hoc genus omne*. I advise, then, all whose aim it is to stock themselves with a comfortable and irreproachably modern religion, such as gives no trouble, is well-behaved, and can be imported into any company—a religion suited to the current fashion in “cults” and to the tone of eligible society, and untainted by the fatal twang of “fanaticism” which infects anything like orthodoxy—a religion ensuring them, I do not say a peaceful death-bed, but, at all events, an unperturbed life—I recommend all such to disabuse themselves with all possible haste of the belief in the miraculous. For this self-same persuasion is a most vexatious monitor; one cannot feel safe a moment in its proximity; a miracle-working Deity is far too near at hand, and might at any time lay His hand peremptorily on one without notice given! Besides, in that case, our wisdom would no longer be infallible, nor our verdicts beyond appeal; which would render us quite insignificant! And so the belief in miracles is branded as “unscientific” and “obsolete.” It makes one ridiculous in genteel society; it offends many exquisitely sensitive minds which would otherwise be not averse from patronizing a “rational” religion. Christianity must “march with the times,” and make itself presentable, if it is to be recognized in future! The puerile conceptions of earlier days, and the fanatical creed of the Dark Ages may have had some excuse in their own day; but we are living in the *twentieth century*!

“Modern thought” is even so bold as to allege that the belief in miracles is “injurious to religion.” But *what* religion? One that believes neither in God as Father, nor in His Son, nor acknowledges the Holy Spirit, one that denies revelation, inspiration, a fall or a redemption. In place of these it purveys to us under new titles

the stale decoctions of rationalism, the philosophy of the hour, the morality of respectable citizens, and a smattering of theology to be received or rejected at pleasure ; for it produces no change in the life. And is this soul of mine, athirst for immortality, to slake its drought with these poor lees, or satisfy its craving for an *elixir vite* thus cheaply ; and is this to be its plea when after death it appears before a holy God, righteously wroth against sin ? Verily, it is no wonder this party cannot abide wonders ! One single miracle would blow their entire system to atoms.

True, it is not the miracles that Christ performed, but ✓ the miracle of His Person, that is our salvation. All unsophisticated Christians agree that “ wonder-working ” was not the chief end of His Incarnation, but the redemption of men by His substitutionary death on the cross. But what strange logic to argue :—“ I believe in Christ’s deity and His doctrine, but not in His works ! ” In other words, “ because means are not ends, I reject the means.” And what a pitiable spectacle this whole discussion is ! Here is a world, apostate from its Creator, and plunging irrevocably into outer darkness, towards which God has purposes of mercy. He empties Himself of His glory, and becomes man, bringing tidings of life eternal, and His own expiation for its guilt. In proof of the message, He permits a few scintillations of that eternal life to stream forth ; and we, a band of miserable captives polluted with the leprosy of sin, far from greeting these pledges of our Heavenly Father’s grace with tears of thankfulness,—we sit in conclave to determine whether it befits our dignity or matches our infantile reason to believe such things, and conclude that it would be prejudicial to our “ moral sense ” to credit this kind of proof of the goodness and omnipresence of our Father in heaven ! The Lord have mercy on our unbelief !

For our part, we are not greatly curious about the speculations of the human intellect in religious matters, nor about its abortive efforts to construct a non-miraculous Deity after its own likeness, for we hold that "the natural man receiveth not the things of the Spirit of God; they are foolishness unto him; neither can he know them, because they are spiritually discerned." We believe in a living God Who is supreme in heaven and hell, and sees alike the star and the atom and the secret thoughts of the heart, in Whose hand all natural forces are as wax; and accept miracles with thanksgiving and adoration as a pledge and earnest of the omnipotence and loving-kindness of a Father Who can bestow "above our asking or thinking." We cannot dispense with them at any price; and the demand for their surrender, in homage to supposed "advanced thought," that great ignoramus which cannot tell us whence we come or why we are here, nor what spirit or matter, life or death, body or soul are, cannot provoke from us anything more than a smile.

There are a host of educated people at the present day to whom one feels tempted to put the question, "How long halt ye between two opinions? If the Lord be God, follow Him; but if Baal, follow him!" They coquette with unbelief, and yet will not throw religion entirely overboard. They do not dispute, of course, the existence of God, but, equally of course, their God is not the "extremely anthropomorphic" Deity of Scripture. They talk now and then of a "Supreme Being," a "beneficent Providence," a "favourable lot," and the name of God is occasionally on their lips in the family circle. However, they have a supercilious simper for the Bible: the stories of creation and man's fall are to them venerable myths exhibiting exceedingly primitive religious notions, and miracles are emblematic tableaux, to be spiritually under-



stood; yet they let their children be baptized in the faith, and taught that these same stories are pure and unerring portions of Divine truth. The doctrines of repentance and conversion grate on their ears; but so does the materialistic dogma that "faith, hope and love are merely chemical products." They often take in missionary and religious periodicals,—for their children and household, that is,—but also current literature devoted to the diffusion of "advanced ideas," which is much more suitable for a drawing-room table, though it sneers by innuendo, if not openly, at true Christianity. On Sunday mornings they hear with a show of deference a pastor who is personally favourable to orthodoxy; but at night they will attend a popular scientific lecture, in which, amongst other things, it is "proved" that creation and the deluge are national sagas; and often find their way to the theatre, where they enjoy a laugh at that standing butt of the stage, a fanatical parson, or a squint-eyed canter! In short, they shrink from the frank, consistent espousal of any principle, shirk every moral battle-field, and wish to pose as specimens of Christian *illuminati*, in the character of a "dark light" or "cold heat"; so that with all their tolerance and well-meaning tacking and veering, they manage to be people hateful to God, and of no comfort to the devil!

The results of this insipidity of character are calamitous. It is not the Neros or Attilas, the great transgressors, contemners of heaven, and Anarchists, that demoralize the world: they effect good, in one sense, for they carry out the principles of evil to their proper and shocking issues. The clear manifestation of any principle is salutary. If Satan disclosed himself visibly on earth and wholly as he is, his very myrmidons would desert him. He knows that, and he dissimulates!

It is from the middle classes, who present themselves

every day as patterns to the lower orders, whose "betters" they hold themselves and wish to be held, that the present disintegration of society mostly radiates. The working-man or "member of the proletariat" sees and feels that with all their quota of religion, respectability and superior polish, a tame flexibility and self-complacent egotism form the basis of their character, and that the solitary ambition of these people who "profess and call themselves Christians," consists, in direct contravention of the command of Christ, in making the best of this life, and securing to themselves the utmost possible snugness and comfort. However much this hankering may cling to all of us, yet assuredly that life which knows no higher aim becomes despicably worthless; for even the beast wishes to live, and as much at its ease as may be. At any rate, we ought to quit the hypocrisy, which deceives neither God nor man, of pretending to be "pilgrims to the sky," whilst at the same time making open avowal that we live *in, with and for* this world; yet out of prudential motives and pusillanimity should like to keep a postern-gate ajar, in case there should, after all, be *something* in religion and the Bible, eternity and a last judgment!

Let serious convictions and consistency of behaviour actuate our conduct, most of all in matters religious; for all half-heartedness and paltering here palsies and poisons the entire life far more than in any other quarter. That is a tremendous declaration: "I would thou wert cold or hot! But since thou art lukewarm, I will spue thee out of My mouth."

It is a self-deception to imagine, as many a man does in relation to the Christian study of nature which we have been discussing, that one's business or profession leaves no leisure to consider such a matter. We expect, and indeed require by law, of a self-respecting master, that he should not overtask his apprentices to such a degree

with work as to leave them no time for mental improvement. And shall we suppose that the Great Teacher cares less for men who are His pupils, and gives them space and opportunity to procure their bodily, but not their spiritual bread?

When we reflect how Paul the tent-maker found time to evangelize the world, how Jacob Boehme the shoemaker, Tersteegen the ribbon-weaver, Bunyan the tinker, the rustic Michael Hahn, produced spiritual food without neglecting their vocation, not only for themselves, but for thousands beside, we have to confess with shame that no man lacks time for the quest of spiritual sustenance, but only their strenuous application. Oh, that our wishes and wills corresponded like day and night! and that we would gird up our loins to scale the heights! For heaven is high, and many who would fain enter in will find yonder to their dismay that God's claims are high too! We do not draw near to Him by grovelling week by week in the dust of this earth; nor by merely pursuing our lawful calling, however diligently, earning and husbanding, maintaining ourselves and our children, and securing for them a future exempt from toil! All *that* the heathen do likewise! And rest assured of this, dear Christian, that "the good Samaritan who found thee lying in thine own blood by the wayside, and bound up thy wounds, pouring in His oil and wine, will pay those two pence thou needest for thy lodging here, till He come again to fetch thee home."

## PART II

### I.—THE BIBLE AND NATURE

We will now glance briefly at what the Bible has to tell us about nature.

It does not begin with the Fall and the promise of re-

demption, for great as that is and eternally worthy to be the theme of thanksgiving, yet God did not create man in order to be a sinner needing to be redeemed : but it opens with the majestic words : " In the beginning God created the heavens and the earth." This is the granite portal through which we pass from eternity into time. Here stand the pillars of Hercules, the frontiers of human exploration, beyond which rolls and surges the illimitable, fathomless ocean of the Godhead, blessed for ever and independent of all creatures. When God has become all in all, and we in Him, we shall perceive what it was that moved Him to emerge from His eternal self-sufficiency and serenity, and to fashion all things in and for and through His only-begotten Son. But so long as we continue in this mortal state we are not permitted to pry into that, for it is an inquiry, as Boehme well says, " that embroileth the soul." Nevertheless, pause a moment here and muse, thou pilgrim through the ages, for at this place it is that the road branches to right and left. If this first utterance be inauthentic, away with thy Bible ! it begins with an untruth. But if there be a beginning, a Deity, a heaven and earth which God has created, the book is true throughout even to that final chapter which speaks of a new heaven and a new earth ! For it seems to me preposterous to urge that it is not God but Moses who has given us this narrative. Why did not God prevent him from falling a victim to a false notion of creation at the very outset, and from misleading whole generations thereby ? If this record represents only the personal opinion of Moses, or the view of his day, may I humbly ask the reason why God chose that His word should open with such antiquated rubbish as He foresaw would prove a vexation of spirit to all enlightened intellects in the twentieth century ? When, therefore, the critics would lull us asleep with the assurance that the credibility



of the Bible does not depend on the truth of the first chapter of Genesis—or in other words that God's book begins indeed with a few small lies; but that is of no consequence, for further on there is much in it that is beautiful and true—we enter our caveat, and warn them to keep their hands off the Ark of the Covenant. "Touch it not on peril of your lives, for ye are unclean! Christians or sceptics, one of the twain ye must be!" Assuredly there is no other alternative: however adroitly a man may preserve his balance all his life, perched high in air, in the hour of death he must fall either to right or to left.

"In the beginning." It is the exordium of all religions and cosmogonies: and we shall find that this statement is scientifically better warranted than that of the eternity of matter. But, after that grand prelude, the Bible turns earthward. Undoubtedly God might have given us sublime tidings of the heaven of heavens, angels and arch-angels, cherubim and seraphim, thrones and principalities, touching the manner and reason of Satan's fall, and how he drew legions after him into the abyss, or regarding all the countless marvels that the Almighty fiat has wrought in millions of stellar worlds. But, had He written it in heavenly language, we should not have understood; had He described it in earthly syllables, it would only have stirred unappeasable questionings in our hearts, and diverted us from the wholesomer contemplation of our insignificance, our guilt, our need of restoration. Because the Bible is addressed to inhabitants of earth, it converses with us after a terrestrial fashion. It speaks, as even the greatest astronomers do constantly, of the sun's rising and setting, although, in a strict sense, it is not the sun, but the earth that moves.<sup>1</sup> Or ought God, side by side with a Bible

<sup>1</sup> "No one accuses the poet of untruthfulness or ignorance for singing,

'Calm and deep peace on this high wold,'

for popular use, to have set forth a scientific edition? Pray, how? Viewed from what standpoint? That of Ptolemy or that of Copernicus, or that of the future, of 2000 or 3000 A.D.? Or that of His own perfect knowledge—a volume, on this hypothesis, removed above any human comprehension by its very sublimity of exposition? But the Bible is not designed to supply an explanation of the universe: it is to manifest God present therein.<sup>1</sup>

though not a single atom is really at rest. Then why do we expect this fantastic pedantry in a book written for all ages and conditions? Besides, even a heliocentric standpoint would be inaccurate: it is not the true centre. And were that to be found in the sign Hercules or in Alcyone, we should be ignorant still round what centre *this* point moves." Bettex: *Das Lied der Schöpfung*, p. 210. (E.K.S.)

<sup>1</sup> This point has been well argued by De Quincey. It is often said that it is no business of the Bible to teach science. "For my part I go farther, and assert that it was impossible for any messenger from God to have descended to the communication of merely worldly truth: 1. Because such a descent would have degraded his mission by lowering it to the base level of a collusion with human curiosity. 2. Because it would have ruined his mission by disturbing its free agency and misdirecting its energies in two separate modes, both by destroying the spiritual *auctoritas* of the missionary and by vitiating the spiritual atmosphere of his audience, that is corrupting and misdirecting the character of their thought and expectations. He would have untuned in a moment the spirituality of his hearers, awakening within them the passion of curiosity, and of curiosity in a fierce polemic shape. To have uttered one syllable, for instance, that implied motion in the earth would have tainted the teacher with the reputation of lunacy. To answer the questions prompted by his own perplexing language would have been to let his proper mission be forcibly swallowed up in that of a natural philosopher: but, on the other hand, to refuse all further advance would have been in the popular opinion to retreat from insane paradoxes which it had not been found possible to support. He is ruined for a servant of inspiration by attempting to speak the language of scientific truth. The greatest of astronomers

The inspired Word proceeds, therefore, to depict in vast lapidary style the grand epochs of creation. "The earth was without form and void, and darkness shrouded the deep." A testimony in thorough accord with the voice of science. Supported on a hot crust of granite a hot ocean, and superimposed on that an impenetrable atmosphere steeped in carbonic acid gas. The planet Jupiter is at the present time girdled with a thick nebulous layer, which hides from us the sight of its surface, and no doubt plunges it in darkness: and many astronomers draw the inference from its light specific weight that it is covered with a shoreless ocean of hot water. But at the ordination of God light dawns; the atmosphere cools, the vaporous elements

will stoop to the popular phrase, rather than seem ostentatious. But God, for a purpose commensurate with man's eternal welfare, is by these critics supposed incapable of the same petty abstinence! 3. The Bible must not teach anything that man can teach himself. The whole body of the arts and sciences composes one vast machinery for the irritation and development of the human intellect. No spectacle could more dishonour the divine idea than to see God descending into the arena of science and contending, as it were, for His own prizes. A revelation is not made for the purpose of showing to indolent men that which by faculties already given them they may show to themselves, but for the purpose of showing that which the moral darkness of man will not, without supernatural light, allow him to perceive."—De Quincey: *Works*, III. 202–6, VII. 133–5 (abridged). And similarly S. T. Coleridge:—

"The language of Scripture describes facts of appearance. And what other would have been consistent with divine wisdom? The inspired writers must have borrowed their terminology either from the crude philosophy of their own times, and so have sanctified and perpetuated falsehood, or they must have anticipated the true system without any revelation of the system itself, and so have become unintelligible to all men, or lastly, they must have revealed the system itself, and thus have left nothing for the exercise of the human understanding."—*Remains*, I. 324. (E.K.S.)



stream downwards, and the earth floats in a sea of light with no nocturnal interchange. Was it in and through a luminous mist in space, such as we see in the heavens, that it sailed? It would be unscientific to deny the possibility of this. There are many indications that long after the first creative day, light (and heat too) was equally distributed over the globe, as though it were not dependent on a distant point in space, like the sun, but bathed in a diffused sea of radiance, either solar or nebular. "And God spake." Again the atmosphere clears and becomes air, an expanse dividing the waters above from the waters beneath; a small circumstance seemingly, mentioned in no other cosmology: yet how significant! Question all the scientists of the globe, how it is that the earth is not wrapped, through evaporation, in an impenetrable fog, obstructing the sunlight and shutting us out from all knowledge of other worlds. The reply is that it is the envelope of air that renders the vast circulation of the waters, no less important than that of the blood in the body, possible. High above our heads float the clouds, driven by the winds; and these water the earth. Veritable Amazons and Mississippis rise invisibly by night and day to the sky, and descend again, draining the mountains, forming Holland out of the mud of the Alps, and smoothing and levelling the great plain of South America from the detritus of the Cordilleras: nor are subterranean forces less incessantly restless: for still "the mountains rise and the seas sink" without a single pause.

"And it became evening." For God had already named the light (that is, the time of its duration, no matter how long) *day*, and the darkness *night* (Gen. i. 5). This verse distinctly implies that He does not confine Himself to one diurnal measure or magnitude: they are epochs of light interrupted by equal intervals of darkness; but how long we are not told. Besides, we have in the Bible elsewhere



abundant examples of the fact that the Hebrew *yom* designates an indefinite period of time.<sup>1</sup> After a long spell of light the volcanic forces of the deep broke loose, as they did when Mount Jorullo arose in Mexico, and lately when Javanese Krakatoa collapsed, only with far more terrific impetuosity, enshrouding the earth in a protracted night. This, too, is a perfectly scientific representation. "Then God spake: 'Let the waters be gathered together, and let the dry land appear'"; and two worlds, severed as day and night, two counter-poles of height and depth, disclosed themselves. That which lives in the water dies on land: what lives on land perishes in the sea. "And God said, Let the earth bring forth." It was The Eternal Word that wrought the work of vitalization—not atoms nor forces of nature, insensible of life; how could they beget "a soul beneath the ribs of death"?<sup>2</sup> All manner of vegetation, forests of rank luxuriance, araucarias, calamites and ferns, our present carboniferous strata, immediately rose from the new-born land into the hot atmosphere charged with carbonic acid gas. Cuvier, the founder of palaeontology, declares in his *Discours sur les Révolutions du Globe* that "Moses has bequeathed us a cosmogony, the accuracy of which is marvellously corroborated every day."

It is really the height of pedantry to tax Moses with inexactitude or falsity because, whilst he was tracing in broad panorama the cardinal moments of creation and the framing of a vast vegetable world, he passed over the small marine organisms that also flourished at this epoch. As though it were incumbent on him to furnish us in thirty lines or so with a precise catalogue of organisms in general. Am I indulging in untruth if I record that at the time of Tacitus dark forests of pines and beeches still covered the greater portion of Germany, because I make no register of

<sup>1</sup> Cf. Gen. ii. 4, Isa. ii. 17, 20, etc.

<sup>2</sup> Milton: *Comus*, l. 562.

the snails on the trunks of the trees or leave out the newts in the puddles? Professor Quenstedt of Tübingen—no Christian—does not hesitate to speak admiringly of the Scriptural account. “Moses,” he says, “was a great geologist, from whencesoever he derived his wisdom,” and adds, “The venerable Moses, who makes plants appear first of all, is still unrefuted; for in the very lowest strata there are marine *algae*.” Again, speaking of the formation<sup>1</sup> of the sun on the fourth day: he exclaims, “How true! for our small globe must have assumed its permanent figure far earlier than the gigantic sun.”<sup>2</sup> We cannot stay to investigate whether this view is correct, but merely ask the reader to note that it is quite possible to be an accomplished and learned natural scientist without shrugging one’s shoulders disdainfully over the Biblical history of creation, as so many inferior intellects esteem it a “scientific duty” to do. Similarly, the rationalist Mildenhauer says: “The spherical condensation of the earth must have come to an end before that of the sun, and the latter, small in circuit, but of blinding lustre, emerged from the phantasmagoria of the heavens only long after the origination of the former.”<sup>3</sup>

Once anew fiery forces of the deep broke loose, and swathed the globe in night and darkness; new peaks uprose, new gulfs yawned; until at length quietude supervened, and light again appeared. “Then God spake, Let the waters teem with a multitude of living souls, and let the fowl fly above the earth.” And to this day the waters bring forth their myriad swarms, till the observer is almost fearful lest the life of the ocean should become too prolific, and the sea be choked with its own exuberance. This was the era of the great monsters of the deep, the millions of *sauria* whose fossils we find embedded in the Jurassic strata, and

<sup>1</sup> The word used is *asah*, prepared; not *bara*, created.

<sup>2</sup> *Die Schöpfung*: pp. 8, 27. <sup>3</sup> *Das Weltall*: vol. I. chap. 8.

of the earliest birds. The traces of the Mesozoic period are thousandfold : skeletons of its sea-monsters are to be found in every well-stocked museum. The remains of birds (to which the expression "teem" is not applied) are much scantier, nor indeed do they lend themselves so well to petrification.

When, after another long season of night and convulsion, the august word of creation again reverberated, all kinds of quadrupeds appeared, together with our surviving trees ; a great step in advance. It is true, small rodents have been discovered in Triassic or even earlier deposits, a harbinger of the future purposes of God. But it is in the Cretaceous formations that what Professor Fraas designates the " zone of the mammals " is reached. Last of all, man, created by the counsel of the Elohim in the image of God, stepped forth, parted, as geology confirms, from the previous creation by no further intervening night.

The critic has nothing to urge against this cosmogony. Whosoever denies that, agreeably to this record, the deeps ✓ of ocean first of all covered the earth and darkness the deep ; that the earliest continents and mountains, and then a mighty world of vegetation uprose ; that millions of aquatic animals next appeared, followed by a world of quadrupeds, and last of all by man, *repudiates the Bible and geology at the same time.*<sup>1</sup>

In this world of nature was man designed to live, and to rule and exalt it in divine strength. "Thou *shalt* eat of all the trees of the garden." Is it not true that man is lord of creation ? Does not his fear and dread lie on all the beasts ?

<sup>1</sup>" It seems inevitable that false revelations which have descended from remote ages should be committed to a false science. The ability, in the earlier ages of the world, of drawing the line between what man can and can not of himself discover, is an ability which man cannot possibly possess."—Hugh Miller : *Test. of the Rocks*, pp. 351, 9. (E.K.S.)

But is it not true likewise that, conscious of his fall, he "is afraid because he is naked?"

The Bible here exhibits man to us in strict alliance with nature. Because he fell, the ground has indeed been cursed for his sake; and yet he is bound to feed himself from it, "till he returns to the earth whence he was taken." Afterwards, when the waters from above and those from beneath, sundered by divine wisdom, had flowed together again because of man's sin, and drowned humanity, God laid a curse on the tower and the city, and caused the vehicles of His will and recipients of His spirit, the patriarchs, to live in the open field of nature, roaming from crag to coast, and worshipping and waxing strong in soul on mountain-top, in oak-grove, and underneath the palm-trees beside the well. The noble expanse of Oriental landscape, presenting unvaried but majestic features, was to be the background of their soul's life. Moses, the greatest of all the prophets, the especial friend of Jehovah, upon the expiration of his term of pupilage at Pharaoh's court, is spiritually hardened forty years at Horeb in the sublimest of scenery, a combination of sea, desert and mountain, and reconciled with nature before God prescribes him his life-work. And the people, whom he is to lead to a land flowing with milk and honey, is brought under his discipline in that same desert of Sinai.

August is the view of nature taken by the law revealed there: indeed, nature is its groundwork. The Israelites are not to be an industrial, commercial, fishing, hunting or nomad people, but a "natural race" in the finest sense of the term. They are to dwell in the midst of nature, on the divine blessing multiplying its fruits; to celebrate their festivals in its society; to bring invariably to God the firstfruits of this divinely fashioned and sanctified creation, to which they are to render its Sabbath, its breathing-space, its year of Jubilee: to treat it ever justly and considerately; and



are promised as the goodly recompense of obedience His choicest natural boons—corn, oil and wine and fruitful showers. These are beautiful, because healthy ideals for a nation, and healthy because natural, and they are natural because they are Divine.

The reverential fulfilment of this plan of relationship with nature is a grateful and exalting feature of the Jewish tradition. Beautiful is their esteem for creation, the “shadow of Jehovah” as they style it; their recognition of two principles, the clean and the unclean, pervading all its divisions; their dread of marring the divine “form” (Zurah)<sup>1</sup> in any of the creatures, or of defacing it by violence or artificial breeding or copulation; their belief that any such sullying of the earthly brings about a sullying of its complement in the higher nature; whereupon, they say, ‘the angels mourn, because their power to work for the glory of God and the welfare of man is thereby curtailed.’

It is on this naturalistic basis that the law founds divine and human justice, already implicit therein; for nature and law are one. First of all it inculcates that the creature, like the creation, stands in view of the Creator, and ought to walk before Him. Theocracy is the natural polity. For it is God who is Creator and Preserver of the universe, and therefore its King, and continual honour and worship is His due: His service is the end and the blessedness of the creature’s existence. Wheresoever he may be, by day or by night, at home or abroad, the Israelite stands before the flaming eyes of Jehovah, a holy and jealous God, who will not hold the sinner guiltless. The holy law is admonishing him every moment of his life, and holding forth the inexorable sanction of transgression: “That soul shall be cut off from among his people.” To be admitted to serve God is the highest possible preferment. A seventh portion of life belongs to Him. It is peremptorily enjoined that the

<sup>1</sup> צִוְרָה Ezek. xliii. 11. (E.K.S.)

plough, sickle and wine-press, the maidservant and manservant, the ox and the ass, should rest for twenty-four hours. Woe to the man who merely gathers sticks ! it is death to him. There is a cessation of all human employments and transactions ; the creature must appear before his Maker utterly inactive. How significant !

The divine service was profoundly symbolical. Without, in the wilderness of this world, remain the multitude ; the elect of God enter through fire and water into His sanctuary, where the perpetual triune manifestation of God, well-known to the Israelites, as is evident from the Cabbala, was made between the brazen laver that purges the unclean and Ariel, the lion of God,<sup>1</sup> burning up the sacrifice. The Father and Sustainer of all life gives twelve loaves to the twelve tribes each day ; the Son, the Messiah, brings perpetually to the Father His fragrant mediation ; and the Holy Spirit beams for ever in sevenfold effulgence. Within, in the holiest place of all, God is throned in darkness between the cherubim, for no man can see Him and live ; and none but the cleansed high-priest once a year dare present with trembling awe the golden vessel filled with blood, wherein is the life of all living things. How beautiful is this image and reflection of the heavenly temple !

After prescribing the order of the service of God, the law expounds the great ordinances of nature relative to man. Chief and first the enormity of bloodguiltiness, and the sole principle of inflexible justice : “ an eye for an eye, a tooth for a tooth, a life for a life.” The prevalent traffic in slaves is visited with death. Next follows a ratification of the sanctity of the family, and of the ties of wedlock ; the power of the father, the reverence due to the mother ; he who strikes father or mother, or curses them, is to be put to

<sup>1</sup> This allusion rests upon a particular interpretation of Ezék. xliii. 15, 16, where the phrase אֲרִיֶּאֱל is used for the altar of the mystical temple. (E.K.S.)

death. No penalty is adjudged for patricide ; such an outrage is inconceivable under the law of Moses. The unity of the family, the city, the tribe and finally of the entire people, is next affirmed. Each for all and all for each, in curse or in blessing. The inviolability of property is secured, yet a thief is punished with clemency ; for there is no sacredness in possessions or money. There are added a number of admirable institutions, based on natural principles—the priest without patrimony, whose heritage is the Lord ; the gratuitous, public administration of justice by the elders, the grey-haired men, with appeal in perplexing cases to the priests, who in their turn could inquire of the Urim and Thummim ; the cities of refuge, etc. How smoothly and inexpensively was this natural state administered, constituting, as it did, a compact, circumscribed whole, but affording free range within its borders to a patriarchal fashion of life. It knew nothing of prisons, reformatories, dungeons, far less of the rack, or the barbarities of the Middle Ages. If any one damaged another's property, he was allotted to him as a servant, yet not beyond a term of seven years. His master is to reward him good for evil ; train him by useful employment into an honest and serviceable character ; and if the plan answers, so that at the expiration of his term, he does not wish to leave him, he is to be received into the membership of the family. We, on the contrary, set a thief in a house of correction at the public cost and thus seal his ruin, in order to be rid of him.

But the joy and poetry of life also meet with recognition. Sumptuous, obligatory festivals, governed by the cycle of the seasons, serve as a strong bond of union to Israel. Hearty compassion for the feeble, the stranger, the widow and the orphan are made a duty. The cattle, the trees and even the soil possess their privileges ; extortion is interdicted ; exemption from military service considerably pro-

vided for in many instances ; and he who seeks a pledge from the poor man is to wait outside until he fetches it. But severely as Jehovah punishes unrighteousness, He will not have His people to be marked by rueful, melancholy visages. "Thou shalt rejoice and be glad with thy manservant and maid-servant and the stranger, and shalt eat and drink of all things wherewith the Lord thy God hath blest thee." There was no "problem of existence" for Israel in time of war or peace, for the state or the individual : one question only, that of obedience or disobedience. "If ye hearken to Me, saith the Lord, I will command a blessing upon you ; but if ye refuse to hearken, I will lay waste your land." We Christians have much to learn from hence—we on whom the ceaseless anxiety for a pittance of earthly good presses, dominating with its menace our politics and treaties, legislation and daily life, trade and fine-art ; so that, when we prosper, we only hope for God's blessing as a matter that would not in the "ordinary course of things" make much difference, but in any case will do no harm. Lastly, in order that Israel might not be weighed down by cares, not regard its rational system of ownership and cultivation as the source of its prosperity, the great institute of the Sabbatical year was appointed. Sow not and reap not in the seventh year, but eat what thy God causes to spring up without any labour of thine ! What should we, who deem ourselves far advanced above Judaism, say to such a test of faith recurring every seven years ? And then the Lord presents His people with the grandest of all laws, the year of Jubilee, sufficient in itself to irradiate human life and gladden a whole nation—a redemption from guilt and suffering, and a sublime symbol of heaven itself.

These are sound ideals of legislation, correspondent with the true needs of man. Well might Moses utter that challenge : "What nation is there so great, that hath



judgments and statutes so righteous ? ” Every soul which “ hungers and thirsts after righteousness ” will echo the words of that wise ruler and statesman, King David, and cry, “ Thy law, O God, doth quicken my soul ! ” But he will view with deepening despondency our modern legislation and modes of judicial procedure. We frame laws one day, and abolish them the next : what one court pronounces to be law, another quashes and declares unjust ; and when an attempt is made to assist innocence in obtaining its rights, or to impose bounds on lawlessness or blasphemy or immorality, there is a general outcry of perplexity and squeamish objection, everybody fancying themselves aimed at, their interests prejudiced, their liberty restricted ! “ *Fiat justitia, ruat caelum,* ” said the ancients, and the Puritan Ironsides and Huguenots re-echoed it. But we crave laws which will not make us smart, will neither limit nor lay obligations upon us, but subserve our class or private interest, and leave the field open to our lucrative speculations. Justice is left out of the reckoning. What can be done with a nation that sets up utility and expediency in the room of righteousness ?

It is becoming more and more apparent what incalculable mischief the misinterpretation, ignoring and undervaluation of the Old Testament, even in our pulpits, has produced. We are losing the sense of justice, because we regard the majestic Law of the awful Jehovah and its fulfilment in the case of Israel and the nations at best as a piece of history, a defunct, spiritually superseded economy ; as though a divine institute were not of everlasting significance. We are losing the sense of truth, because we treat as poetical exaggeration or figurative language the oath which God swore to His people by His prophets. And thus we have forfeited all interest in and comprehension of His dealings with nations and His plan of human history, of prophecy in general, and the great inspiring hope of the

supremely glorious and real accomplishment of His promises. Two-thirds of the word of God lie fallow ; we know not what to make of them. Hence, too, it comes that we chatter about a "sinister Hebrew God of vengeance," or ask with infantile ineptitude how it can affect our Christian faith whether Abraham ever lived or not. Far otherwise spake Jesus : "Ye do err, not knowing the Scriptures. Have ye not read what was spoken unto you by God, saying, I am the God of Abraham, the God of Isaac and the God of Jacob ? God is not the God of the dead, but of the living."

Christ Himself stands or falls with the Old Testament. If that be a late forgery, and Abraham never existed, He who believed in Abraham, and came into the world "that all things might be fulfilled which were written in the Law of Moses and in the Prophets and in the psalms concerning Him," was nothing more than a Jewish Rabbi entangled in prejudices and errors, who projected an unsuccessful reformation which cost him his life. Then farewell to Christianity !

We grant that religion here below cannot be divested of an element of relativity ; for it expresses itself in outward forms not absolutely coincident with the truth. But for this very reason we ought to the very utmost to preserve it from contamination by modern influences or additions. Everything of temporary import is emasculating to Christianity ; a mere excrescence, an intermixture of clay with iron. Divine things are not to be adjusted to human. All attempts to modernize Christianity, to conciliate human wisdom and reason, to dilute its unyielding doctrines for the sake of our debilitated generation, are foolish make-believes, and being births of the passing moment will not outlive it. The absolute truths of the Bible have as little to do with "evolution" as mathematical axioms. It tells us that all men are sinners. Are there different categories of sin

for the civilized and the savage ? To sin Scripture traces death and all suffering. Are we not still mortal ? Are our tears and compunctions of conscience of another order than those of the ancients ? Is sin no longer a transgression of the law, and do we no longer need God's Ransom for it ? A new age can as little rehabilitate or adapt eternal truths as a child can invent a new alphabet or new numbers, or new geometrical forms, or colours different from those of the spectrum, or imbibe them in a new manner. The modern mother loves and fondles her child just as Rachel and Leah did : and, whether he be prince, professor, or peasant, a man loves and fears God no otherwise to-day than Noah and Abraham feared Him. But the fact is, the whirl of trade and of mechanical and physical inventions has so mounted to our heads that we can no longer distinguish between the stable and indestructible and that which is flexible and evanescent, and are no longer in possession of that fixed point, that base of operations, whence the whole world can be moved. Because we have discovered electric railways, kodaks, wireless telegraphy, and other playthings of the kind, we are able, forsooth, to invent more admirable moulds for divine truth than those which God has provided ! As well try if we cannot devise a novel and more brilliant formula to replace the old proposition that " twice two is four " !

How comes it that we have grown so blind to the noon-day brightness of the revelation of Jesus Christ, Jehovah alike in the Old Testament and in the New, conspicuous in the forefront of Genesis as well as in the Gospel and Apocalypse of John : the image of the invisible God " Whom no man hath seen nor can see " : by Whom " were all things created that are in heaven and earth, Who is before all things and by Whom all things consist " : Who named Himself to Moses " the Lord, the Lord God, merciful and gracious, abundant in goodness and truth, keeping

mercy for thousands, forgiving iniquity, transgression and sin ; but that will by no means clear the guilty ; visiting the iniquity of the fathers upon the children unto the third and fourth generation of them that hate Me" ? When David rejoiced that the Lord was his Shepherd and Healer, it was because he beheld in the power of the Spirit the Messiah of Whom he prophesies. It is the same Jehovah Who declares to John : " I am Alpha and Omega, the First and the Last " ; the same Divine Person Who, albeit He renounced the exercise of His justice during the term of His voluntary humiliation, and in the depths of His loving-kindness dealt familiarly with sinners, yea, bore our guilt upon His cross, nevertheless denounced woe on the Pharisee, proclaimed to the Jew the destruction of Jerusalem, to Judas eternal-damnation, and enacted a code more rigorous and awful than the Sinaitic with the fiat, " Ye have heard . . . but *I* say unto you, Whosoever of you saith to his brother, Thou fool ! is in danger of hell-fire." Who can stand before thunderpeals like these, or that other fulmination, " Ye serpents, ye generation of vipers, how can ye escape the damnation of hell ? Wherefore, behold I send unto you prophets and wise men and scribes . . ." These are the accents of the Jehovah of the Old Covenant ; and it is the same Holy Spirit that indited the imprecatory psalms, Who struck Ananias and Sapphira dead for a " small " act of deceit, and delivered the Corinthian delinquent, and Hymenaeus and Alexander, to Satan. This Jehovah-Jesus is that Messiah and Avenger of Whom Isaiah and Ezekiel prophesy in terms whose exact fulfilment John witnesses and describes in the Apocalypse. Here is a revelation cast in one mould, a God who is " the same yesterday, to-day, and for ever."

But, for lack of the adamantine foundation of the Old Testament, we construct mere castles in the air. That man who has not been, and is not daily, crushed by the



inexorability of the moral law may prate glibly of grace : know it he does not. And so we come to fable and dream about "Christian Socialism," and a church "without dogmas," and a religion of undiluted love, harbouring even God's enemies within its indiscriminate embrace ! And with this regimen of sugar and water we think to assuage the Black Death : these are the houses of cards that are to bid defiance to earthquakes to come !

Sooner or later, a retribution overtakes the rejecter of dogmas. A religion without tenets is like a man without bones or spine—a molluscou affair. It leaves the child of dust imbedded in sand-drifts or clinging to a slippery shelf of rock, the plaything of each ebb and flood, incapable of standing upright or looking toward the sun, much less of spreading wing or soaring to the sky. Moreover it is as rank an imposture as a geometry divested of axioms. The very proposition, "No more dogmas," is itself dogmatical. The writings of this clique are brimful of postulated articles of faith, for which just as unconditional a belief is demanded as the church claims for its *credenda*. For the man who refuses to recognize the divine law falls a prey to the insensate law of his own heart's choice.

Yet, in common with all things that are divine, the iron law of Sinai has stood the test. It shaped into a nation a multitude of slaves demoralized by 400 years' servitude.<sup>1</sup> It laid unparalleled requisitions both on individuals and a whole community, and welded it into that coherence and implanted in it that virility at which we are still forced to marvel, in spite of two thousand years of degradation and enfeeblement. Let the spiritually blind gentlemen who can discern in "the law of the Lord" nothing but a posthumous fabrication of the epoch of Ezra take counsel together, and concoct an analogous patchwork which shall

<sup>1</sup> According to the German reckoning, based on Ex. xii. 40. (E.K.S.)

be to our contemporaries what that law was to Israel ! Nothing is more sorely needed. Ah ! *la critique est aisée, mais l'art est difficile* !

With what glorious pictures of nature are these inspired books filled ? Look how Job draws his philosophy of life from a survey of the dominion of God in His works ! And when his proof of knighthood is fulfilled, and the Lord Himself displays in words like thunderclaps, and pictures such as He alone could paint, the nativity of the world and the power and lordliness of His creatures, and challenges him to assert that a Being Who had created these could err in the conduct of *his* life, Job perceived well what this proof drawn from nature signified.

When that great warrior, statesman and poet, David, meditates a new song for his "chief musician," it is not his feats of arms, nor the splendours of his court and palace, nor the impregnability of his cities that he celebrates, but the Law of the Lord, his "solace," his "study by day and by night," from whence he learned wisdom for government ; even as his Boast, his "Rock" and "Fortress," is the Lord God of Sabaoth. But the second object of his affection and never-wearied admiration is the creation of God. Thus we see him snatching up his harp as he descends, from the pinnacles probably of the city of David, a tempest swelling up from the Great Sea, rebounding against Lebanon and spending itself in the wilderness of Kadesh (Ps. xxix.), and summons around him his sons and mighty men to join in magnifying "the voice of the Lord." And finally, in Psalm cxlviii., he rapturously convokes the entire universe to acclaim in concert with him the name of Jehovah.<sup>1</sup>

The Scriptures throughout are fraught with a remark-

<sup>1</sup> The divine bard speaks moreover of laws of nature. "He hath stablished them for ever and ever : He hath made a decree which they shall not pass by" (Ps. cxlviii. 6).

able sense of what we term "atmospheric changes." For all our meteorological forecasts and tables of *minima* and *maxima*, we do not comprehend the controlling elements or incessant fluctuations of these forces, or why one year is cold and damp, the next hot and dry, whilst all ascertained factors appear identical. The Biblical view of nature consistently passes by phenomena in this as in other matters, in order to fix upon the First Cause of all. "He sendeth hail and frosts: He setteth His bow in the cloud: He maketh lightnings for the rain and bringeth the wind out of His treasures." He is Lord also of the weather.

Nowadays there are numbers of people who smile with a superior air at these things, and remark that such conceptions "were congenial to the Hebrew mind. We, however, are acquainted with the cause of thunderstorms and rainbows."<sup>1</sup> What should we think if a son boasted that he had discovered that what he had once, as a child, taken for his father's voice was nothing but a little air proceeding from the lungs and converted by the action of the glottis into vibrations? Or were we informed that the *Madonna di San Sisto*, reputed the chief masterpiece of art, was merely an ochre pigment mixed with oil, and repeatedly laid on with a brush of marten's hair or swine's bristles? Had God brought about thunder and lightning hyperphysically, the wise men of this world would have argued that they were only a hallucination of the sense of hearing and an optical illusion "of no scientific significance whatever"; but, inasmuch as natural agencies are employed, they are "purely physical phenomena with nothing in the background." Pray, how is God to effect these occurrences so as to fall in with man's ideas and conduce to his belief in the Worker?

<sup>1</sup> Cf. Keats' lines:—

"There was an awful rainbow once in heaven:

We know her woof, her texture," etc.—*Lamia*. (E.K.S.)

To return to our subject. It would appear that Solomon, an encyclopædist like Aristotle, and collector of animals and rare fruit-trees, used these to illustrate a course of prelections on natural history. For "he spoke of trees from the cedar of Lebanon to the hyssop . . . also of beasts and of fowl, of creeping things and of fishes; and there came of all peoples to hear the wisdom of Solomon."<sup>1</sup> The Song of Songs teems with natural pictures of an Oriental richness. The prophets likewise are never weary of foretelling how nature too shall bloom and rejoice when God pities His people, and fulfils His promises towards them. Let us shun the weakness of resorting to an allegorical construction of the facts, as soon as the actual truth grows too sublime for us to conceive.

The Bible announces a close connexion between nature and human action in general, ever since the ground was cursed for man's sake, and in particular between the children of Israel and the land of their possession—another divine sequence in which we have lost faith. "There is no truth nor mercy nor knowledge of God in the land. Therefore doth the land mourn and everything that dwelleth therein languish, both the beasts of the field and the fowls of heaven: yea the fishes of the sea also are taken away."<sup>2</sup> But when the Lord shall show mercy to His people, and they return to Him, the consequence will be a renovation of Syrian fertility. "In that day Israel shall be the third with Egypt and Assyria, a blessing in the midst of the earth." Then will dawn the great Sabbath ensuing on 6,000 years of mourning and travail, when the earth itself shall be glad, after tarrying so long for the "liberty of the glory of the children of God." Many are the passages in which the prophets anticipate with jubilation this great renaissance of creation. "The wilderness and the solitary place shall be glad for them, and the desert shall rejoice

<sup>1</sup> 1 Kings iv. 33, 4.

<sup>2</sup> Hosea iv. 1-3.



and blossom as the rose. It shall blossom abundantly and rejoice even with joy and singing." "I will open rivers in high places and fountains in the midst of valleys: I will make the wilderness a pool, and the dry land springs of water. I will plant cedars in the wilderness, the acacia, the myrtle and the olive: I will set in the plain the cypress, the pine and the larch tree together, that they may see and know and ponder and understand that the hand of the Lord hath done this." "Instead of the thorn shall come up the cypress, and instead of the nettle<sup>1</sup> the myrtle: and it shall be to the Lord for a name." "The wolf also shall dwell with the lamb and the leopard lie down with the kid, the calf and the lion's whelp and the fatling together, and a little child shall lead them. And the cow and the bear shall feed together and their young ones couch together, and the lion shall eat straw like the ox." "They shall beat their swords into ploughshares and their spears into pruning-hooks: nation shall not lift up sword against nation, neither shall they learn war any more. But they shall dwell without fear, every man under his vine and under his fig-tree."<sup>2</sup> Such are the magnificent promises and mighty consolations with which the Old Testament, given to a people ordained to dwell in the bosom of nature, concludes. But instead of believing in and rejoicing over these divine engagements, our weak impoverished hearts, with their scant measure of faith, find employment for their ingenuity in emasculating and limiting these sayings of the Holy One of Israel, who has pledged Himself to "hasten it in its season." Far from welcoming them with an ingenuous simplicity, we cry, "How shall these things be? I cannot

<sup>1</sup> Germ. Brennessel. The Hebrew *sirpod* is of doubtful interpretation. (E.K.S.)

<sup>2</sup> Isa. xix. 24; xxxv. 1, 2; xli. 18-20; lv. 13; xi. 6, 7; Mic. iv. 3, 4.

understand this or that detail." Meantime the world derides the shamefaced pusillanimity of our putative faith. "If thou canst believe," said Jesus, in His loving-kindness to the sinner, "all things are possible." "*And He marvelled at their unbelief.*"

It is obvious that in the New Testament, which proclaims the forgiveness of sins and spiritual redemption, nature can occupy only a secondary place. Yet here, as elsewhere, it forms the substructure and background of the whole. As Moses at the introduction of the Law stands on Horeb before the burning bush, as Elijah meets us at Cherith on the threshold of prophecy, so we find the great evangelical herald, John, beside Jordan at the opening of the New Testament, another "man of nature," reared in the desert and sustaining himself on locusts and wild honey. He does not go in quest of the powerful and rich and learned, the people or soldiery, to their habitations and cities, but "there went forth the whole of Jerusalem to him"; a symbolical departure from our artificial, sophisticated life in order to hearken to divine truth in the broad field of the creation. How does even Jesus Himself live after this pattern? He goes to Jordan for His baptism, retires forty days into the wilderness, teaches on a Mount, and sleeps in the open air or on the sea. Usually there is much to tell of the dwelling and home of a great man; we hear about its situation, its appurtenances and furniture. Christ has none of these accessories. When He wishes to be private, He ascends a height, and prays there a whole night long. What a spectacle! The Son of God standing on a mountain-summit in the profound stillness of night, communing with His Father; beneath Him, lying in darkness and the shadow of death, a world which He has set His face to redeem; above, the stars which His hands fashioned, describing those very orbits He had ordained! We do not know what the Elohim said: but, had we heard those

utterances, the creaturely intelligence would not have caught their meaning !

The part which the wilderness, the sea and the mountain occupied in the life of Jesus is well known. He draws His similitudes from natural objects, and bids us mark the fig-tree, the lily of the field, and the fowl of the air, and learn lessons from them. Even in the days of His humiliation, He controls the sea and the winds which He had long ago created. He chooses fishermen for His apostles ; and that creation which glowed and exulted at His birth grieves in concert with its King upon the cross.

The apostle of the Gentiles and great organizer of the church of Christ had not much leisure to devote to nature. However, he too borrows similes from the seed and the wild and cultivated olive, and utters that profound sentence, dark to us here below, but stirring mighty anticipations in our hearts, touching the " languishing of creation." " The earnest expectation of the creation waiteth for the manifestation of the sons of God. For the creature hath been subjected to vanity (not willingly, but because of Him that hath so subjected it) in the hope that the creation itself shall be delivered from the bondage of corruption into the liberty of the glory of the children of God. For we know that the whole creation groaneth and travaileth in birth-pangs together until now " (Rom. viii. 19-22).

Finally, in the Apocalypse, all creation is convened to the Great Assize. Hitherto we have listened to single voices ; now all things participate in the great chorus and finale of the universe. Lightnings flicker, the seven thunders utter their voice ; hail falls, every stone " about the weight of a talent " ; the winds are disenthralled, the sea and its waves roar, and the powers of the heavens are shaken. God's direst judgments smite mankind, but also the creation that he has desecrated, with desolating, incessant strokes. But that is not the end. There rises out

of the fires a renovated nature, radiant, fair and clean ; a new heaven and a new earth, still regulated by the same divine, imperishable laws. Here too the tree clothes itself in verdure and blossom, bearing perfect fruit, and leaves with virtue to make whole ; here too, in the light of eternity, flows the crystalline river ; here too they drink of the exhilarating juice of the vine, and " sit down " in the kingdom of God. The white raiment is one of the trophies won from six thousand years of sin and suffering, and stands over against Adam's nakedness ; the city and its golden streets contrast with a Paradise where there were no dwelling-places ; and the introduction of a divine art points to a divinely-framed nature.

Thus the Bible begins with the fashioning of creation, publishes to us tidings of the redemption of man and nature, and closes with the re-establishment of this divine cosmos. How does it happen that so many Christian people conceive of it merely as the material substratum of life, hardly worthy, from a religious point of view, of any notice at all ? But just as (and inasmuch as) all things in this world, including Christianity and the life of God in man, consist of three stages of existence, positive, comparative, and superlative, so we perceive that this earth has been given to us for three purposes. First, that we may live and move in it, walking ingenuously in unison therewith, and tracing out its statute-law, so that we may govern our life by its standard. Secondly, that we may study, search, test and understand nature, and grow conversant with its conformations, adaptations and laws, to the maturing of our inner man. Thirdly, that like Solomon, Socrates, or Haller, who said that " no created mind penetrates into nature's sanctuary," we may confess that no research of ours can fathom the physical world, because there is an infinity latent in it that is the root and cause of all temporal phenomena, though inaccessible to us, immersed



as we are in things finite. From our vain yearning and impotency to sound it, we shall then draw this inference : that there is a loftier physics, the fountain of the lower ; a somewhat above nature, that is its root. I find myself languishing for a knowledge of that ; therefore I was formed for such a knowledge, and shall one day come to possess it.<sup>1</sup>

If we are asked, in conclusion, wherein the notorious and ceaselessly iterated and reiterated conflict between faith and knowledge, nature and the Bible lies, we can only reply that we do not know, and have never succeeded in detecting it. We repeat that we have never yet been able to grasp how an astronomical, chemical, botanical or anatomical fact, a new element or new theorem—and of such facts and truths all science ultimately consists—can prove to us that there is no God ; or that He cannot work miracles ; or that forgiveness of sins is not attainable by faith. As for the Biblical view of nature which we have briefly scanned, it explains the universe, as we shall make good hereafter, better, is more corroborated by facts, and contents the human soul far more completely than eternal matter, primordial cells, or sentient atoms. The brief history of creation and the production of the vegetable world, land and marine animals, quadrupeds and men each after its kind synchronizes indubitably in its chief outlines with the epochs of geology, and is therefore geologically ratified. Darwinism, on the contrary, is invalidated by the facts of geology.

We intend to show that the Biblical record of creation is better warranted scientifically than the eternity of mat-

<sup>1</sup> " What sound principle of philosophy forbids our inferring that the sum of human expectations are to be held infallible indications of what awaits the species, as physically prophetic of its destiny ? We freely allow that an adherence to baseless prejudices is a characteristic of human nature ; yet it must by no means be granted that the common instincts of the human family are nugatory, and have no final cause."—Isaac Taylor : *Physical Theory*, p. 160. (E. K. S.)

ter. Whilst the Bible presents a logical, and consequently scientific, elucidation of life and death, the conscience and the soul, morality and religion, all the aspirations, in fact, and apprehensions of the human spirit; materialism offers no solution of the kind. The final resolution (not annihilation) of all elements by the agency of tremendous heat (2 Pet. iii. 10) and the new creation emerging from this catastrophe, are in perfect accord with the sciences of astronomy and chemistry. Spectrum analysis again, the science of the revelation of elements by fire, is a true figure of the Final Judgment.<sup>1</sup> Lastly, the passage from man to angel is precisely what all the evolutions of nature aim at, as the materialist contends. And the promise "Ye shall shine as the sun in the kingdom of my Father,"<sup>2</sup> is no mere poetical figure, but contains a transcendently far-reaching and scientific definition of the highest form of life. Natural science regards the generation intrinsically of light, heat, electricity, and force in all its phases, which we behold in the self-sufficing life of the sun, as the highest possible condition of being. We exist on this globe, illuminated only from without, numbed into opaque bodies,<sup>3</sup> in a region of ice and death. That is a scientific fact; as we have seen, we dwell quite in proximity to absolute cold, parted by less than 300° from a state in which even frozen gaseous molecules become wholly inert.

The clamour about the irreconcilable conflict between science and religion would be perfectly inexplicable, if we were not aware that people have at all times allowed themselves to be hoodwinked by catch-words which they accept blindly, without testing their truth or falsehood, as soon as

"The spirit of everything," said Jacob Boehme, centuries before these discoveries, "reveals itself in fire, and each thing gives forth a separate light."<sup>2</sup> Matt. xiii. 43.

<sup>3</sup> Nos noxia corpora tardant,

Terrenique hebetant artus moribundaque membra.

—Virg. *Aen.* vi. 731, 2.

they fascinate them, and coincide with the secret proclivities of their hearts. The Bible and nature do not clash with one another ; although there are many things in nature discrepant from other things which men have read into Scripture. Many scientists of the present day, however, do infuse their irreligion and animosity against God into their conception of nature. A vine and a plant of night-shade growing side by side in the same soil produce a generous wine and noxious poison respectively. So nature is our allotted soil, from which, according to the principles that guide our life, we extract nutriment or poison ; and the ground is not to blame for that. Let it be remarked that it is not the study of nature that is responsible for the hatred of God which signalizes our century ; otherwise, how could many a prominent natural scientist be a God-fearing man ? But it is because the heart of the generation is at feud with God that its scientific views are so likewise.<sup>1</sup> That has happened from time immemorial. For it is empty declamation to pretend that the scientific research of the nineteenth century first ascertained the invalidity of the truths of Christianity. Men have at all times inwrought good and evil, light and darkness, wrath and love, into all their speculations and investigations, their handiworks and musings. Fools were found even in David's day to affirm that there was no God, and Isaiah describes Jewish materialists as crying : " Let us eat and drink, for to-morrow we die." <sup>2</sup> The world rejected and crucified our Lord eighteen hundred years ago without the benefit of " advanced science " or

<sup>1</sup> " It is remarkable that the only thing which God claims of man in Scripture is the heart. But here lies the misfortune ; this claim of the creator to the hearts of his creatures cannot be complied with because they have already disposed of their hearts another way." Lord President Forbes : *Reflections on Incredulity*. (E.K.S.)

<sup>2</sup> Isa. xxii. 13.

“advanced criticism.” The Sadducees jeered at a future life, the existence of spirit and the resurrection, though they did not enjoy scientific illumination, exactly as their present-day successors ; and the voluptuous Romans of the Empire despised and persecuted the Christians precisely as Socialists and Anarchists do, or would do, nowadays, had they the power.

My friend, if you still complain of an irreconcilable antinomy between faith and knowledge, be assured that it does not lie in the stars above you, nor on the wide earth round about, nor yet beneath the earth, but in your own heart. You are not at peace with God ; you are afraid of Him, and justly so, for you are at odds with your Maker ; and fancy that you discover reflected in universal nature that deep-reaching, inward cleavage which goes down to the tap-roots and prime sources of your being ; since this scientific standpoint of yours is part and parcel of yourself.

Seek Him, nevertheless, even if you are hardly able to believe in His existence. Call upon Him with a prayer such as this : “ O God, if Thou dost exist, reveal Thyself to me, Thy creature, and let me not perish in darkness and uncertainty ! ” Persevere in your cry ! Hardly anybody esteems the expenditure of a whole lifetime too much in order to acquire a fortune : remember that far more than a fortune is at stake here.

And then, either in this life or that beyond the grave, let me hear tidings how you have sped !



## CHAPTER IV

### Science : A Criticism

"In his heart the scientific worker knows that underneath the theories that he constructs there lie contradictions which he cannot reconcile. The higher mysteries of being, if penetrable at all by human intellect, require other weapons than those of calculation and experiment."

LORD RAYLEIGH : *Presidential Address, British Association, 1884.*

"Nam rerum parens (i.e. Natura),  
Libanda tantum quae venit mortalibus,  
Nos scire pauca, multa mirari iubet!"  
HUGO GROTIUS : *Epigrammata.*

#### I.—ITS LIMITATIONS

LET us scrutinize more closely this proud word, than which there is none whereto the German, at any rate, would pay greater deference. "The latest scientific researches!" At once everybody takes off his hat; and although the public are not seldom presented, in illustrated or other papers, with some long ascertained fact or absolutely unproved assertion under this title, yet everything thus labelled is most deferentially handled. "Unscientific!" With that home-thrust and a shrug of the shoulders an unappreciated book, a displacent notion, an unpalatable truth or its advocate, are figuratively dispatched like a fly with a flapper. A somewhat more sedate, intelligent and independent sifting and testing on the one hand, and more candour and open-mindedness on the other, would not be amiss here.

Justifiably enough this word enjoys a tribute of respect. With His own spirit God has breathed into man a necessity of knowledge that will not be denied, an inextinguishable thirst after wisdom. His passion to know what he is, what the world and God are, raises him above the beast. "Man," says Pascal, "is wretched, because he is man, and great because he knows it."<sup>1</sup> But the ground of this passion lies deeper than in the mere pleasure of mental acquisition. It is not so much Knowledge the Beautiful as Knowledge the Potent which is the soul's element. "Its joy consists in action." I can only act on things and beings that I am cognizant of, whose nature I penetrate to some extent; that gives me the power, naturally or preternaturally, to control them: for which reason inferior natures discard the knowledge of remoter objects as purposeless, and ask:—"Of what use is that to me?" To know is the primary condition of power. Adam only procured lordship over the animals when he had surveyed them, and given them designations conformable to their inmost natures. A dim surmise of this truth survives still in the longing after the true names of things embodied in that ever-recurring query,—“What is that plant, animal or human being called?” Doubtless Adam would have attained the knowledge of good and evil, and permission to eat not only of the fruit of all the other trees, but also of the “tree of knowledge,” had he first proved by obedience that he did not wish to usurp this wisdom as an act of rapine, but to accept the boon from God's hand at God's own time. Satan, however, foe of truth and therefore of genuine science, well knew how to annul this boon to man by that lie of his, “Ye shall know

<sup>1</sup> “La misère de l'homme se conclut de sa grandeur, et sa grandeur se conclut de sa misère. . . . Il est donc misérable puisqu'il le connaît; mais il est bien grand puisqu'il connaît qu'il est misérable.”—*Pensées*, ii. Art. 1. (E.K.S.)

good and evil." Truly we do know to our cost that there is a good and an evil ; but what evil is and what is good,—therein lies the dilemma and tragedy of mortal existence ! And as our happiness is a slight degree of misfortune, our health a gentle sickness, so is our science no more true knowledge, but only lesser ignorance : for since the Fall it has been the lamentation of mankind that the mighty volume of creation, inscribed within and without in spiritual and material hieroglyphics, continues ever sealed with seven-fold seals.

What then is Science ? On closer inspection nothing else than the extant sum of human knowledge ; though in general the term is rather understood to signify the assiduous investigation and winnowing of facts, their perspicuous enumeration, and the logically drafted statement of the intellectual results thereby accruing.

We know but too familiarly that this sum of knowledge is a chequered framework of light and darkness, truth and error, unassuming research and censorious arrogance, audacious hypotheses and theories that are proved, millions of facts and billions of speculations ; a medley of intuitive and acquired, affirmative and negative ideas, dreams past and future, inexorable prose and high-flown poetry ; of materials marshalled by much enterprise and wakefulness, with ambition and vainglory, honest industry and resolute thinking, tardily, swiftly, unrestingly ; a composite fabric continually to be rebuilt, constantly claiming repair ; waxing ever greater, never perfectly complete. " Experimental sciences," says Humboldt, " are never finished ; the multitude of sensuous perceptions is inexhaustible ; no generation will ever be able to boast that it has surveyed the total field of phenomena."

This aggregate of human knowledge is, as such, worthy of veneration. How great its extent we cannot tell ; very great, taking into reckoning all the thoughts, reflections,

sensations of the millions who have lived ; not so great, to him who distils from these the accredited result. When we ponder what a sum of impressions of the world, of men, of plants, and animals, implements and their use, of language and its logic, a child of ten has acquired, we may doubt whether the greatest scientist gains as much by ten years' study. A like conclusion may be reached by another road. When we consider that there have been men such as Aristotle, Goethe, Humboldt, etc., who have contrived within the space of fifty years, more than half of which must have been sacrificed to the demands of daily life, to embrace in an impressive conspectus the whole area of human knowledge, we are astonished both at the number of ideas that a human mind can master in a few years' space, with the aid of not much more than three and a half pounds of cerebral matter, and still more at the circumscribed range of our collective knowledge.

Does not this knowledge then, so hardly won, merit our estimation ? Has not science tendered countless, invaluable services to humanity ? Is it not essential, indispensable, if man is to be anything better than a poor savage Patagonian, engrossed solely in the catching of a few fish from some leaky boat, then devouring them half-cooked in order to support his miserable existence ? Undoubtedly. We, too, prize science, so far as it connotes knowledge. Far be it from me, my brother, to disparage thy thirst and passion to know, or the zealous fervour with which thou huntest for building materials, and haulest them up to the massive but never-completed pile of human wisdom ! I also would fain learn who I am, and what others are, what creation is, and good and evil—that great enigma, which none but He that, in the heaven of heavens, dwelleth in light inaccessible, comprehends fully. But I see that other and greater men than I have had to confess lugubriously with Socrates that they knew only that



they knew nothing ;<sup>1</sup> to cry with Solomon : “ I said, I will be wise ; but it (truth) was far from me. Far off is that which is, and exceeding deep ; who can fathom it ? ”<sup>2</sup> or to exclaim with Faust :—

“ Alas, I have explored  
Philosophy and Law and Medicine,  
And over deep Divinity have pored,  
Studying with ardent and laborious zeal ;  
And here I am at last, a very fool  
With useless learning cursed,  
No wiser than at first,  
Here am I—boast and wonder of the School !  
And now to feel that nothing can be known,  
This is a thought that burns into my heart ! ”<sup>3</sup>

He who has had no part in this anguish of mind, who has not become “ poor in spirit ” thereby, may be a man of learning but not of wisdom !

We have no intention here of enumerating or discussing the achievements of science ; that would require many bulky volumes. Equally little do we propose to chant a paean in its honour, or to touch on its advances in certain departments, its retrogression in others, its utility to the human race, or its lofty functions. That is a business daily discharged, orally or in print, by hundreds of other people called or uncalled to the office, qualified and unqualified, men of serious aims, and others who are merely concerned about their own self-glorification. But, if for no other reason, yet because this goddess, who criticizes things divine and human, is so irresponsibly extolled at the present day, it would be advisable and timely to practise a little criticism on her, and briefly to inquire on what foundations she erects her haughty structure, what means of knowledge stand really at her disposal, and, further, what bounds are

<sup>1</sup> ἔγω δὲ, ὥσπερ οἱ οὐκ οἶδα, οὐδὲ οἶσμαι.”—Plat. *Apol. Socr.*  
21c.    <sup>2</sup> Eccles. vii. 23, 24.    <sup>3</sup> *Faust*, Part I.

prescribed her, and what may be her peculiar foibles. Should it look to many as if in these observations we had not a sufficiently exalted opinion of her claims, the error possibly rests with those who assign her an inordinate dominion, and an infallibility which she certainly does not possess, as the most learned of her ministrants indeed acknowledge without reserve.

Many people to-day treat it as a thing beyond question that "where science begins, faith ends." For, say they, science is grounded on plain, admitted facts, such as can be attested by any one; but faith on nothing but an affection of the mind, a more or less obscure state of feeling. We will examine elsewhere how it stands with Christian faith in this respect. As for science, a scrutiny of its fundamental grounds will soon disclose the fact that in the last instance, it also rests on axioms, on dogmas of belief, on hypotheses that do not perfectly elucidate the facts, nor are themselves susceptible of proof or conception.

To take the case of mathematics, not unreasonably held to be infallible in its deductions and propositions, and regarded by a man like Plato as the highest, indeed sole, form of science. No doubt, it pursues its track with absolute exactitude and inexorable logic: the chain of its syllogisms cannot be snapped asunder. In geometry or algebra, trigonometry and the integral calculus, whoever has once conceded the premiss A must grant the conclusion B. But the first link of this catena is suspended in the air. I am free to affirm A or to deny it; the entire structure reposes on axioms. No mathematician, whatever his skill, can impart the very conception of unity or multitude to me, supposing that I do not possess it, and equally impotent is any man to prove to me (what nonplussed ancient Socrates)<sup>1</sup> that one and one make two; or that the part is less than the whole; or that a straight line is the shortest

<sup>1</sup> Vide Plato: *Phaedo*, 101c.

distance between two points, or that both  $A$  and  $B = C$ , then  $A = B$ . Even mathematics, therefore, begins by claiming from us the liberty of supposition without further demonstration, so that on this basis of belief her ensuing deductions may be established.

The case is similar with the sciences conversant with matter and its properties, physics and chemistry. What "matter" is science knows not. "The essence of matter eludes our immediate study."<sup>1</sup> To explain the chemical combinations of elements that form the material universe, chemistry asserts an "atomic theory," the said atoms exhibiting incomprehensible and repugnant properties. To explain the phenomena, the atom must possess all the properties of bodies; for how else can these latter come by them? But to explain the definite proportions of the chemical combinations that take place it must be indivisible, a property which, conceived in relation to matter, is simply an unimaginable negation. Dr. Mayer, of Geneva, in his work on *Force and Matter* remarks on this head: "Since no thinking can furnish proof to us that matter consists of separate molecules (relatively atoms) of infinite minuteness, what occasions this conviction? The fact that all chemical and physical phenomena of matter can only be explained by such a supposition; but nothing is gained hereby except the subsumption of a great number of hitherto incomprehensible things under a single incomprehensible conception (so-called) comprehensive of them all."

Physics treats, no doubt, of forces; but can the greatest scientists inform us what forces are? Let us hear Dubois-Reymond's verdict. "In face of the riddle as to the nature of matter and force, and how they are able to think, the

<sup>1</sup> Kekule: *Die Wissenschaftliche Ziele und Leistungen der Chemie*. ἡ δ ὕλη ἀγνωστος καθ' αὐτήν.—Arist.: *Metaph.* vi. 10. (E.K.S.)

scientist must once for all adopt the most reluctantly yielded device, *Ignorabimus*. Never shall we know how matter thinks!"<sup>1</sup> Elsewhere he makes the bold assertion that "possibly neither force nor matter exist, but are mere abstractions."

In like manner the whole of astronomy subsists on the theory of gravitation. Of this power Newton himself, its discoverer, says—what for that matter every astronomer will at once subscribe to—that bodies act as if they attracted one another; but whether they do so in reality, and how they should, is beyond his comprehension. Elsewhere he adds: "I do not consider here how these attractions may be performed. What I call attraction may be performed by impulse or by some other means unknown to me. I use that word here to signify in general only a certain kind of force by which bodies tend towards one another, whatsoever be the cause."<sup>2</sup>

The newer astronomy, in order to explain gravitation and the distribution of light and heat throughout the universe, imagines a universal "ether," which, beside other singular properties, is six hundred billion times lighter than our air; to us therefore quite immaterial. Nevertheless the pressure of this ether must neutralize the force of attraction. We make no objection to this hypothesis, though we do not understand how, in conformity with it, the satellites of Mars can revolve faster than their planet;

<sup>1</sup> *Über die Grenzen des Naturerkennens*, p. 34.

<sup>2</sup> Optics: Lib. III. Qu. 31: *cuiusque demum causae attribuenda sit illa vis*. Cf. his second Letter to Bentley, in which he says: "that gravity should be innate and essential to matter, so that one body can act upon another at a distance through a vacuum without the mediation of anything else by which their action may be conveyed from one to another, is to me so great an absurdity that I believe no man who has a competent faculty of thinking in physical matters can ever fall into it." (E.K.S.)



but after all it remains a hypothesis merely. Supposing that by its aid the phenomena and structure of the universe are better deciphered, it will by degrees become an article of faith, yet never become susceptible of direct demonstration; for by what means can we comprehend or perceive imponderable matter such as this ?

In like manner, botany and zoology, biology and physiology, treat of organisms discriminated from the inanimate world by the ascription to them of life. Professor Seubert of Tübingen observes of this "doctrine": "Chemistry has indeed manufactured thousands of material organisms, but not one containing within it the breath of life; the vital force abides a secret." And Dr. Müller remarks with reason of our aggregate knowledge: "All philosophy hinges, as Herder says, on a postulate. We know that two multiplied by two makes four; but no one can tell us why."<sup>1</sup>

Science, then, the entire knowledge of humanity, scanned by a calm, impartial eye, rests on indemonstrable truths, on axioms implanted by God in our souls. Were it otherwise, we could not have put them there. Our wisdom is purely deductive; and in lieu of the high-sounding phrase "he who knows, believes not," which is in truth a token of much ignorance, every genuine student will coincide with the far more laudable utterance of the poet Geibel: "*the end of philosophy is to recognize that we are bound to believe.*"

<sup>1</sup> "Every how ( $\delta\acute{\iota}\omega\tau\iota$ ) rests ultimately on a that ( $\delta\tau\iota$ ); every demonstration is deduced from something given; all that is comprehensible from some revealed fact which we must believe as actual. As we did not create ourselves we must take our existence, our knowledge upon trust: and that philosophy is the only true one which does not revolt against the authority of our natural beliefs."—Sir W. Hamilton: *Discussions*, p. 63.

## II.—ITS INSTRUMENTS

If we next inquire with what implements science works, what tools are subject to her regulation in order to explore the physical and human world, the answer is very simple. They are the *five senses*. Whatever ingenuity may be displayed in the invention of an ever-improved apparatus for observations, measurements and adjustments of phenomena, and in the correction of these ingenious inventions by still more subtle re-adjustments, and the fabrication of instruments which, like the self-registering barometer, thermometer, hydrometer and hygrometer, keep reckoning day and night of their own doings and themselves report and specify all that occurs with the utmost precision, yet in the final resort we can only perceive by the five senses what all these instruments have to tell us. Of what avail can photography or the microscope or telescope be to a blind man ?

But are not these sensible impressions, as has frequently been urged, mere subjective representations received in the form of sound, light, heat, by our brains from an action of matter on them which in reality wears a totally different complexion ? Then at all events they fall short of absolute veracity, and the aggregate of our ideas of the world and of ourselves, and indeed of the divine nature, founded as they are upon these sensible impressions, would have at best only a relative and fluctuating worth. *Nihil in intellectu quod non fuerit in sensu* !<sup>1</sup> Only through the doors of the senses does knowledge penetrate to the mind. Conceive a child of average intelligence, but bereft of all the senses, blind, deaf and destitute of taste, smell and touch ; how could such a being, even in the course of years, obtain a single notion of the world or of God ? No

<sup>1</sup> The celebrated summary of Locke's metaphysics, to which Leibnitz retorted in his *Nouveaux Essais* by merely adding the clause, *nisi intellectus ipse*. (E.K.S.)

senses, no conceptions. If these are subjective only, so are those, and we are landed in the realm of that celebrated school of metaphysics which regards the exterior world as merely predicated by our minds.

But facts protest against this view. Even animals of inferior status exhibit a formation of particular senses far surpassing ours. The condor pounces from an altitude almost above our ken on an insignificant carcass. Night-butterflies fly for a distance of miles, right across the lake of Constance, for example, attracted by the scent of certain flowers; insects of some kinds possess a marvellously delicate sense of hearing; and the performances of blood-hounds are matter of common knowledge. Sir John Lubbock, the indefatigable observer of the ant, has shown that this tiny creature, as well as the small water-flea *Daphnia*, perceives the ultra-violet rays which escape our vision; and so they see more colours than we do, and different ones. But agreeably to the above-named theory, the highest organized beings should have the best senses, or reversely, creatures of such delicate and developed senses as these a more extended, finer and sublimer comprehension of the universe and the Deity. On the other hand, if the senses present us with absolute facts,<sup>1</sup> it is not hard to comprehend that with a less extensive range of sensible impressions the higher brain of man may suffice to lay up far more intellectual capital. That these impressions are

<sup>1</sup> The realistic view of Reid has been well expressed by Dr. McCosh:—"When the mind contemplates matter, it is cognitive, not creative."—*Method of Divine Government*. App. VI.

"It is very true that we cannot conceive how the ego can be immediately cognitive of the non-ego: but our ignorance is no sufficient reason on which to deny the possibility of the fact. As a primary fact of consciousness, we must be ignorant of the why and how, for we have no higher notion through which to comprehend it, and if it involve no contradiction we

alike to all, and that one man does not see that as blue which to another is red, is proved by the coincidence of the states of mind produced by the impressions of colours and tones. Not only do all men, and especially those in morbid states of mind, regard red as a vivid, glowing, stimulative colour, but the most dissimilar animals, the bull, the turkey, and the crocodile, a quadruped, a bird, and an amphibium, are similarly affected. All men consider light-blue a mild and pleasant, and black a melancholy colour, and all receive the same divergent impression from melodies in a major and minor key respectively.

On these and similar grounds we must assume that sound, light, heat, etc., are real, authentic manifestations of matter, extrinsically existent, and independent of our perception of them. This is the view taken by the Word of God. When an eminent scientist writes: "The Mosaic statement, 'Let there be light!' is physiologically erroneous; light began when the first red eye-point of an *infusorium* first distinguished between bright and dark," we can only express astonishment at the carelessness with which these Messieurs, in common with certain other parties, consult the Bible. For it stands on record, "God said, 'Let there be light!' and there was light; and *God saw the light* that it was good." Here we have a divine intuition as much above the barely naturalistic as the divine eye is higher than the "red eye-point of an infusorium." There are senses in the Eternal whereof ours are but an imperfect replica.

These senses teach us in many other ways that they are very deficient, and that we perceive by their help but a very small section of the surrounding creation. We live like an impoverished prince in an ante-room or attic of the great palace, not having the slightest acquaintance with are philosophically bound to accept it."—Hamilton: *Metaphysics*, II. 118. (E.K.S.)



many of its halls, galleries and colonnades. The energy of the invisible radiation of the spectrum is 7·7 greater than that of the visible part, in other words, we have no vision of the strongest colours, and cannot represent them to ourselves in the least; in fact, we see only a very small portion of the various shades at all. Consequently, modifications are observed on the photographic plate which take place in what we term darkness, the disclosure as black dots of minute stars that no human eye ever beheld. To speak properly, our ear hears exceedingly ill, appreciating only eleven octaves, according to Helmholtz, or even fewer, for many people are deaf to the shrill piping of the bat; yet we are assured by physicists that there must be thousands of octaves. Our sight, hearing, taste, and smell extend to a mere fragment of the creation. We are blind, deaf and dumb to many of its phenomena, and this is true also of our soul's life.

We are ignorant whether space has not four, or multiplex, dimensions, and whether there are not innumerable senses; God is infinite, and so, in a manner, is His creation. In any case, our five senses inform us that there are other senses now on the earth. To revert to the animal world. When, as Spallanzani tells us, blinded bats, placed in a room intersected by a quantity of threads set in connection with tiny bells, whirr round and round with lightning speed without driving against them, or when a tortoise caught in the Pacific Ocean, and thrown overboard as sickly in the English Channel, is fished up again three years later in the Pacific still branded with the ship's mark, our reason is quite at fault. How, we may ask, has the creature groped its way a distance of four thousand leagues round Cape Horn, through the total darkness of the sea-depths? What shall we say of migratory birds, which by a surprising "instinct," as we meaninglessly phrase it, repair again to their previous haunt beneath the eaves of the clay

huts of the *jellaheen*, or in some Egyptian temple, or re-visit Tunis or the Soudan, and next spring with the like regularity re-discover their cottage and village church in Swabia or Normandy, or their home in London or Moscow, though they see so many brooks and hamlets and hills precisely similar? Or of pigeons transported in baskets from Holland to Spain, and not loosed till five years afterwards, which put in an appearance a few hours subsequently in Brussels? When a dog, left behind three months, follows the trail of his master amid millions of others, over rivers and mountains, from Russia into France—no sense of scent will be adequate to explain the sagacity displayed. In view of such facts we must assume unknown senses, most of all in the case of the lowest animals. There are eyeless worms (*lumbricus*) that constantly shun the light, and have a remarkable *penchant* for the shade and night, and a kind of mollusc, also blind (*pholas*), which immediately draws in its "tube," if a single cloud obscures the sun. The well-known small *patella*, the limpet, makes expeditions for food, but always returns to the same smooth ledge of rock. How can such a piece of gelatine, devoid of organs of sense, recollect, recognize and find its way? It is even more mysterious how infusoria, consisting only of a liquid-filled "sac," such as the *paramaecium*, avoid their enemies, pursue their prey, and eat only particular species—all without a vestige of visible organs! Here we are brought to our wits' end!

Physics, too, instructs us that other senses must exist. Heat is of different forms and kinds, and has its *nuances* and modulations,<sup>1</sup> but we are sensible of one single heat alone, and discriminate merely between positive and comparative stages, presenting the same relation to it as the colour-blind to light, who view the world only as bright and dark. Had we had a sense of heat as developed as that of colour,

<sup>1</sup> See Tyndall on *Heat*.

what a multitude of fresh impressions and enjoyments we should have obtained ; for in that event we should have had a "caloric," as we now possess a "chromatic" art ! We lack, moreover, the sense for electricity ; we cannot distinguish between positive and negative electricity. A new world would dawn on us and on science, if God endowed us with this sense ; and conversely if He had denied us that of smell and taste, no man would ever have suspected that there were varieties of perfume or flavour. So many senses, so much knowledge !<sup>1</sup>

This universe is circumscribed to us by the number and acuteness of these organs ; they define the pale within which science can expatiate.<sup>2</sup> Peradventure there is a hint of fresh and more perfect senses contained in that text, "What eye hath not seen, nor ear heard, nor hath it entered into the heart of man to conceive,—that hath God prepared for them that love Him."

### III.—INSOLUBILITIES.

On the topic of the limitation of science within the bounds

<sup>1</sup> The senses are adits of knowledge ; therefore restrictive means of information. They give us information only concerning the last product of certain combined qualities or conditions of matter."—Isaac Taylor : *Physical Theory*, pp. 57, 62. (E.K.S.)

<sup>2</sup> "It is evident that nothing exists for us except in so far as it is known to us, and that nothing is known to us except certain modes of existence which are analogous to our faculties. The universe may be conceived as a polygon of a thousand sides or facets. Now of these sides all may be equally essential, but three or four only may be turned toward us. If the intelligences, reduced to the three senses of touch, smell and taste, were then to assert the impossibility of any modes except those to which these three senses were analogous, it would not be more unwarrantable than if we were to deny the possible reality of other modes than those to the perception of which our five senses are accommodated."—Sir W. Hamilton : *Lectures on Metaphysics*, I. 141, 2. (E.K.S.)



of sensible perception, the lucid thinker and celebrated scientist Dubois-Reymond has delivered an equally celebrated lecture, to which he appended subsequently a second. He merely utters explicitly what many had already thought and perceived; indeed, he himself makes the confession that "he was almost ashamed to present such a vapid draught to German scientists, or to repeat truths so trite and so long recognized by eminent thinkers." All the same, the debate aroused, and the bitter reproaches cast on him by materialists, evince no less than the sometimes hyperbolic jubilations of the more orthodox (as though something new had been established by this man's award) how timely his words were. We shall therefore quote the substance of his conclusions.

First of all Dubois-Reymond declares that natural science is the reduction of the modifications in the material world to atomic motions, or the resolution of the processes of nature into the mechanism of atoms. He then adopts the expression of Kant, that "in each school of natural philosophy there is no more genuine science than there is of mathematics to be found in it." Plato said long since: "God works chiefly by geometry."<sup>1</sup> He then cites the testimony of the astronomer Laplace. A mind that for a given moment knew all the forces which vitalize nature, and the reciprocal conditions of being which underlie it, and was able to subject these products to analysis, would comprehend in the same formula the motions of the greatest orbs and the lightest atoms; nothing would be contingent to him; the future and past alike would be present to his gaze." He proceeds to inquire what frontiers of knowledge, what insoluble problems would confront even such a mind, the highest human intellect conceivable, and discovers several.

<sup>1</sup> ἡ ἰσότης ἢ γεωμετρικὴ καὶ ἐν θεοῖς καὶ ἐν ἀνθρώποις μέγα δύναται.  
—Plat. *Gorg.* LXIII. 508. (E.K.S.)



"Of these," he says, "seven in all may be discriminated. I term those of them 'transcendental' which appear to me insuperable.

"1. The first puzzle is the *nature of matter and force*—one limit of knowledge *per se* 'transcendental.' All advances of science have prevailed nothing here, all further advances will avail nothing. For even the mind referred to, so superior to ours, would be no wiser in this respect, and we have to admit in despair that we have here reached the verge of our wisdom.

"2. The second puzzle is the *origin of motion*. We see motion arise and disappear. If we try to predicate a primal condition, we are obliged to represent matter to ourselves at rest an infinite time since, and equally distributed throughout infinite space. Since a supernatural impulse does not adapt itself to our supposed cosmos, a sufficient cause for the first motion fails us. Or we conceive of matter as moved from eternity, and so at once renounce our intelligence in this point.

"3. The third problem is the *first appearance of life*. I see no reason to treat this problem as 'transcendental.' Once set matter in motion, and the world might arise; then under appropriate adaptations that peculiar state of the dynamic equipoise of matter that we term life might have come into being. Or, conceding a supernatural act, only one day of creation would be necessary. (?)

"4. The fourth puzzle is presented by the apparently intentional, *final conformation of nature*. Darwin, by his process of 'natural selection,' showed a possible way of evading the fact; although our experience continually, in following this doctrine, is the feeling of a man sinking hopelessly, but clasping a single plank that just keeps him above water. This problem is not irrevocably "transcendental," however hesitatingly serious and conscientious reflection may have to pause in front of it.

"5. The fifth puzzle, however, is absolutely so. *Consciousness* is this inexplicability. What imaginable relation subsists between definite motions of definite atoms in my brain on the one hand, and on the other the (to me) primary, unquestionable fact that I feel pain, pleasure, am hot or cold, taste sweetness, smell the scent of roses, hear the notes of an organ, see the colour red, and the consciousness immediately ensuing, that I exist? It is absolutely inconceivable that a heap of atoms of carbon, hydrogen, nitrogen, oxygen should be otherwise than

indifferent what situation they occupy or what motions actuate them. It is impossible to discern how consciousness could arise from their interaction. Should their collocation and motions not be indifferent to them, each single atom must be conceived of in the character of a "monad of consciousness." But neither would this explain consciousness in general, nor afford the least help towards the explanation of the individual consciousness.

"6. It is with some hesitation that I declare the sixth enigma to be *intelligent thought* and the origin of language, its next-of-kin. (Already treated of under consciousness.)

"7. In close connexion with the last-named appears the seventh and final enigma of our series, the question of *free-will*." After a protracted consideration of this problem, in which he cites Leibnitz and others, Dubois-Reymond reaches the conclusion that there is no difficulty so long as we deny the freedom of the will, or declare the persuasion of it to be a deception, but that in any other case it must rank as "transcendental." He sums up thus: "Our natural science is therefore bounded by the two limitations eternally assigned it; by the impossibility first of understanding matter and force, and secondly of educing mental phenomena from material conditions. Within these limits the scientist is master of analysis and synthesis; beyond them powerless for ever." He pronounces over these riddles of the universe the famous sentence, "*ignorabimus*,"—we shall never know!<sup>1</sup>

Gratitude is due to this eminent *savant* for his open and frank avowal of that which numbers seek sedulously to gloss over, whilst they proclaim to the world the illimitable potentialities of human knowledge, and that "science reckons no problem insurmountable."

Nevertheless we cannot help thinking that Professor Dubois-Reymond might have penetrated nearer to the root of the matter. We believe that deeper than free-will and consciousness, matter and force, lie the cardinal conditions of existence, which must be first surveyed, in order to erect the edifice of genuine knowledge on a steadfast

<sup>1</sup> *Über die Grenzen des Naturerkennens*: Leipzig, 1891.

foundation of granite. We refer to Time, Space and Number. All things exist in time, no phenomenon is conceivable apart from space ; and all thought is grounded upon the truth that one is equal to one, and that one *plus* one is equal to two.

Certainly, there is a school of metaphysics, already alluded to in our remarks on the senses, of which Dubois-Reymond perhaps is a votary, which teaches that Space, Time and Number have no existence save in ourselves, having their genesis in our conception of them ; and that the universe is *actualized* only in our idea of it. An incomprehensible thing this, that the conception should ever be identified with the being. Then the ocean must be what the mussel fastened to its rock figures it to be ; or the mountain that which the ant conceives of it ! What lunacy that any man should dream that his conception of the Deity was God ! Whither this hypothesis conducts, its adherent Schopenhauer has shown us. After informing us that " Time is a mechanism in our brain for lending a semblance of reality to our baseless existence, and to that of material things,"<sup>1</sup> he proceeds : " The geological conditions antecedent to all life on the earth happened in no consciousness ; not in their own, for they have none ; not in another's, because there was no other. Therefore they had no objective existence at all. Laplace's cosmogony and the geological changes prior to the introduction of organic life are the record of phenomena which, as such, had no existence. For they are phenomena of space, time and causation, which could only exist as such in the representation of a mind, without which they are therefore impossible, and have never been."<sup>2</sup> So the entire primitive rock-

<sup>1</sup> *Par. et Prol. IX : Anhang.*

<sup>2</sup> *Zur Philosophie und Wissenschaft der Natur : Sect. 87.* Bishop Berkeley long ago denied the existence of matter as an occult substratum of bodies, and argued that their "*esse* is



formation with its colossal agglomerations of granite, gneiss and basalt, our Alps and Pyrenees, are the result of processes that "have never existed!" It is superfluous to refute such contentions as these.

We have adduced already some arguments in favour of the objective nature of our perceptions, and hold likewise that Space, Time and Number were before and are without us. Let us glance, not too scientifically, at these three great unities of existence.

Every one fancies that he knows what *Time* is, but all the learned and unlearned together cannot explain it to us. This unknown, invisible entity sweeps us along with it, whether we will or no, with an irresistible vehemence. It matters not whether we look forward with light-hearted impatience to a bridal party, or are facing death in a paroxysm of consternation; the shoreless stream flows silently on, and bears us on its bosom to the ocean. The Deluge of Time past is mounting; it has engulfed our childhood and our youth; swiftly does it drown the half, the whole of life; and we shall vanish anon beneath its tides, and be, for this world, nothing but a bygone event, a thing that has been!

We compute time by sections. But how long is it *per se*? How long is a second intrinsically? No one can tell. We measure it by our perceptions, our reflections. Sensations are transmitted through our nerves to the brain with the speed of an express train; but ten separate impressions are perhaps as many as we can be conscious of in a second. Were our thoughts as swift as the molecules of hydrogen, terrestrial nature would seem numb, dead and motionless to our minds. If we imagine beings

*percipi*" (*Principles of Human Knowledge*, 3). But he inferred, not their non-reality, but their actual subsistence in the mind of God; and valued his metaphysics chiefly as a confutation of materialism and atheism. (E.K.S.)



who think more tardily than we do in the same proportion, to whom our centuries correspond with five minutes of existence, the whole creation would be to them a dizzy vortex or perpetual cyclone ; for such beings could have no time to apprehend a single phenomenon before it was whirled past them.

Yet there is a law of time, inscribed on the firmament, apportioned by the sun and moon. From the comet to the ephemera, all things carry this horoscope in themselves. Every seed we buy has its law of duration graven within it in solar units. One seed, though large and strong like the pumpkin or sunflower, is only an annual ; another, maybe small as parsley, biennial ; a third, such as thyme and many kinds of heath which propagate themselves for centuries, perennial. Thus a lime-tree survives for eight hundred years, a pike for three hundred, a crow for two centuries, an elephant a hundred and fifty years, and the king of creation seventy or " by reason of strength eighty years." Why ?

The ticking of a clock is certainly not the least mysterious and solemn of sounds. We seem to hear our life audibly running out, drop by drop, into everlasting nonentity, monotonously, incessantly, inexorably dwindling ! These moments, these incognitos of eternity, enter into our existence, flash one glance on us, and are gone ere we can stretch forth a hand to detain them. The next in succession may possibly bring us a missive announcing the death of some one whom we dearly love, or inform us of our ruin, or that of a kinsman ; and then our life can never again be what it was before. In any case, " Time is receding, Death advancing," and its catastrophe nears apace, when after a longer or shorter struggle we disappear from sight, and the doctor whispers gently, " All is over ! " Thenceforward we have bid adieu for ever to earth, where Time purled like some tiny rivulet or flowed by like a steady river ; we

are sped where the aeons of true Time, of which ours is but a type and emanation, unroll in the mind of God, an ocean without either shore or bottom; sped where the spirit forgets it has ever been mortal.

In this world men are born and die when "the time is fulfilled."

"Things incomplete here grow to their event."<sup>1</sup>

Each moment lapses into an irrevocable, inviolable past, which no man is able to countermand. Betwixt these two chasms, these two impenetrable eternities, we stand suspended, as the Arabs say, "on the edge of a razor." There is something perpetually falling from us into the past—our personal guilt, that ever-dilating spectre whose shadow overcasts the present and the future. As a farthing, laid by two thousand years ago, would carry many thousand million farthings' compound interest by this time, so a single murder of Attila blots out millions of existences, and one lie makes generations wretched and criminal. The battle of Actium was lost through the panic of a lady,<sup>2</sup> and the history of the world pursues another track in consequence. Fifteen hundred millions of men to-day (irrespective of the rest of the creation) suffer by reason of a single act, because Adam once "stretched forth his hand and took and ate." But the good deed also bears fruit after fruit. One grain of corn in time yields an immeasurable harvest; and one word of truth spoken long ago works still a thousandfold effect, reduplicated throughout all ages. We and our actions are ever-during.

<sup>1</sup> "Das Unzulängliche, Hier wird's Ereignis": a very obscure oracle. Goethe: *Faust*, Second Part, Act V. *sub fin.* (E.K.S.)

<sup>2</sup> i.e. the flight of Cleopatra. Vd. Plut. *Vit. Anton.* lxvi. It is singular that Lucan likewise attributes the retirement of Pompey at Pharsalia in part to anxiety about the safety of Cornelia. "Tu quoque, conjunx, causa fugae, voltusque tui." —*Phars.* vii. 675: (E.K.S.)

"Ye are gods!"<sup>1</sup> Yet what is this past or future really? Every other pilgrim gazes on the path ahead of him; but we pace rearwards, viewing only the tract we have passed over, unconscious whether we may not at our next step stumble backward and plunge down the steep! Are there worlds where the inhabitants look forward only? Where the past is as enigmatic, as unsounded and anxious as to us the future, and the future as familiar as to us the past? So at least it was with the Hebrew seers, and with Balaam when he cried—"I behold Him, but not nigh!"<sup>2</sup>

Neither can we comprehend the mystery of *Space*. Is it finite? Then what is there where it ceases; what are its frontier lines? Is it infinite? How can we represent that to the mind? Is matter infinite? For what is space without matter? If we found ourselves in vacant space, how could we ascertain that we were in motion, whether at a snail's pace or the lightning's? How could "here" and "there" be discriminated? What is motion or magnitude? Grant the infinity of space, and nothing is either great or small. The pyramids impress us by their size; a 4-inch model of them is a toy. Of course! because we refer magnitudes to ourselves, and measure by our foot or hand-breadth, or by a "meter," the forty-millionth part of the meridian. But what is our true stature? On an asteroid we are giants, like Mont Blanc; scarcely ants on the sun; invisible particles of dust in the universe; placed under a microscope of twenty-thousand times magnifying power, twenty-five miles long! Even such a conception does not now satisfy the chemical student, in whose view we are conceived of as solar systems rotating with frightful speed; nebulae composed of numberless billions of atoms and molecules endowed with marvellous never-slumbering forces, perpetually conglomerated and again diffused; each atom, or molecule, perhaps as far

Ps. lxxxii. 1, 6.

<sup>2</sup> Num. xxiv. 17.

relatively from the next as Jupiter from the earth! How large is an atom to an angel? How great are we in the eye of the God of Space, who sees every one of the countless atoms of our frame? Immeasurably great, humanly speaking. Such and yet more insoluble problems arise on a mere cursory inspection of Space. Yet without it can exist no shape or size, or motion, or creature.

Nor is *Number* less inexplicable—Number, the prototype of thought, the condition of being. It is the *sine qua non* of the universe, the inexorable law, the fatalism of existence that one is equal to one, and that two multiplied by two makes four; facts amazingly simple, and yet incomprehensible. This innocent-seeming Number, the first principles of which a child masters, stretches out over the earth far as the remotest fixed stars, and beyond them, farther than the bounds of thought. In spite of our familiar toying with large figures, Number remains to the thinker in its higher potentialities an impressive and frightful mystery. To take an instance. The largest number that we can write in three ciphers is obviously 999. When we pass to the powers of this number, we meet with the expression (numerically similar to the former, but significantly vaster)  $9^{99}$ , “nine to the ninety-ninth power,” a number with 90 “places,” and so huge that a globe whose circumference was equivalent to the circuit of the earth round the sun would contain far fewer grains of sand! Almost equally stupendous is the number “nine to the ninth power to the ninth power.” Here our faculty of imagination has already deserted us. But when we write the number  $9(9^9)$ , it is as if on the mere addition of this bracket, like a powder-magazine on which a spark has fallen, that digit had exploded into a gigantic, diabolical, super human magnitude; for these three numerals now denote a number with 370 million places, which would extend in an ordinary sized hand writing from Berlin to the Adriatic (620 miles),



and for which all the languages of the world combined could not provide a stock of words ; a tolerable portion of which not all the men in the world could reckon over in as many millions of years as there are grains of sand on the globe ! Yet this number exists, first of all in the Divine Mind, next in infinite space as a magnitude, in infinite time as an aeon ; and millions of such magnitudes and aeons do not exhaust space or time. What forms of life may not exist in these inconceivably distant spaces ? Where shall we immortals be during these unimaginable aeons ? All our present ideas superseded, how may we progress towards God ! For there is a divine progression, and a divine expansion of the divine in the divine.

Yet this number is *per se* neither great nor small, or, to express it otherwise, even in its smallest elements is infinite. In every circle however miniature, drawn with ever so fine a lead pencil, lurks the problem of the squaring of the circle, the relation of the circumference to the diameter, a relation that all the numbers in the world could not exhaustively express. Here are the first decimals of the mathematical  $\pi$  : 3.141592653589799323846264338327950288419716939-937751058809749445923078164062— and so on. This number grows to infinity ; eternity cannot exhaust it, for it is “ irrational ” ; yet it is involved in every pin’s head or grain of shot !

That we comprehend number only in its tiniest, simplest elements, and that it soon grows out of our reach, is a proof that we stand only at the outset of our eternal development. There may be beings having as clear a grasp of the above figure of 370 million places, and who reckon it as speedily as we do those of two. With regard alike to Time, Space and Number, we must confess unhesitatingly, —“ *Ignoramus !* ”

It is not without some surprise that we discover that science, which has so much of interest, truth and use to tell

us concerning the forms and appearances of things, is dumb when required to explain their real essence. To the notorious, often-repeated gibe of materialists like Büchner that we Christians "love to fly to, and ensconce ourselves in, dark corners, which the rays of science have not yet illuminated, in order to spin cobwebs to entangle sound reason," we respond calmly:—verily, there was no need of *flight*. Here we stand on God's wide earth, and interrogate science. What is this environing Space, this all-engulfing Time? Science knows not. What is this Matter on which we stand, and the Forces that animate it? Science knows not. What and whence the life around, and the soul which I feel within me? Science knows not. That "dark corner," on which her beams have not yet shed light, is the collective universe! <sup>1</sup>

Once when I was a schoolboy, I happened to meet a digitary of science. "Stop a moment," I cried, taking off my cap, "I have a favour to ask of you. Tell me why the grass is green!" "With pleasure," he answered affably; "because the cells of plants are filled with green chlorophyll, which shines through the walls of the cells." "Yes," I said, "I knew that already, but why are the chlorophyll granules green?" "Because they consist of a waxy substance which has the property of reflecting the green rays." "What, a green ray!" "Yes; a motion of ether vibrating 660 million times a second." "Do you mean a green vibration? I understand it less than ever," I said; "how can I conceive of such a thing?" "As best you can," quoth he, shrugging his shoulders, and went on his way. So I was left alone to ponder his words. Substance!

<sup>1</sup> "Science is a drop; nescience is the ocean in which that drop is whelmed. The highest reach of human science is indeed the scientific recognition of human ignorance."—Sir W. Hamilton: *Discussions*, p. 634. Cf. Augustine, as there quoted: "Confessio ignorantiae gradus est scientiae." (E.K.S.)

Property ! Green ray ! Motion ! Ether ! Each one of them a fathomless depth to me !

This inability to sound the essences of things is the abiding cause of the inadequacy of all our scientific hypotheses. The inconceivable atom is a case in point. So bodies act as if they attracted one another according to the Newtonian laws, but attraction is an insufficient, because incomprehensible, representation. The theory of waves of sound and light accords with the facts ; but it remains unintelligible how thousands and thousands of " sound waves " reverberate in a concert-room between and through one another without collision or confusion with the notes immediately following ; and, if possible, yet more inscrutable, how millions of undulations of ether paint in the eye of each of a thousand assembled human beings a picture of the surrounding world different in perspective.<sup>1</sup> Our collective theories of capillarity, endosmose, etc., as expounded at our schools and colleges, are very questionable. " If we could generate a temperature of 10,000°," says a scientist with reason, " a new chemistry would at once arise." " The natural science of which we have remarked that it currently contents our craving for causation, really does not satisfy it. It is not knowledge, but the apology for an explanation." <sup>2</sup> (Dubois-Reymond). Nevertheless this acknowledgment of ignorance belongs essentially to true knowledge. Thus is the above-cited sentence of

<sup>1</sup> " The rays of light come instantaneously to the spectator's eye from each of a million bodies fit to reflect light without being disturbed or diverted in the passage by the numberless rays returned by contiguous bodies. That the Being who contrived this mechanism is able to explain it is not to be doubted ; but until it shall be His good pleasure to do so, all we have to do is to admire His skill and power."—Lord President Forbes : *Reflections on Incredulity* (1750).

<sup>2</sup> Germ. Nur Surrogat einer Erklärung ; lit : " locum-tenens."

Pascal verified—"Man is ignorant, because he is man ; but he is wise because he knows it."

#### IV.—THE FOIBLES OF SCIENCE.

It remains to speak of the mistakes of science ; for, being a human knowledge, it has all manner of human imperfections. In the first place there is the endeavour to impress the uninstructed by expressions of the utmost strangeness and technicality, or by a recondite, intricately constructed style. We have often to complain, as Dubois-Reymond does in reference to modern philosophy, that "it has renounced the language of common intelligence and homely reflection, and eschews altogether such questions as attract an open mind, or at best deals with them in lofty condescension as mere pragmatistical demands." Many budding scholars (and others too) fancy themselves called upon to veil their thoughts in clumsy, periphrastical expressions, the most abstract and stilted imaginable, as the proper attire of science, and diligently to avoid every definite, clear, picturesque phrase. To write with vivacity, warmth and freshness, and in a way that all could comprehend at once, would doubtless be unscientific, and incur the stigma of "an amateur hand."

We are all betrayed by words and phrases : at one time by the fascinating, dazzling, moving "duplicity of rhetoric," over which—himself its victim—Petrarch made lament ; at another by a show of learning and self-importance. But whether enthralled by the pungency of wit or the harmless cunning of no-meaning, we are still in servitude, and words, our own words, domineer over us, tyrants with rods of iron ! Man wrestles interminably, laboriously with language, if haply he may make it his vassal and extort truth from it, and, when his life is ebbing away, recognizes that he has been worsted in the encounter !



As the voluble Frenchman is continually lapsing into the sprightly vein of the "*spirituelle*," ever on the brink of venting witty nothings (*de dire des riens avec esprit*), as the equally unconscious Italian seeks to conjure with emotional superlatives, and the Russian is prone to accept the stalest humanitarian vapourings for religious ideals ; so the pertinacious German worships scientific phraseology, and fancies, so soon as he can no longer see bottom, that the water is deep, when, in fact, it is often only muddy ! But that people can be learned *and* peddling as well—that he cannot bring himself to think !

Schopenhauer has passed a trenchant judgment on the far-fetched, artificial scientific mannerism ; for science is addicted to these various literary foibles. "The guiding principle of an essayist should be that a man can only think one thought at a time distinctly, and accordingly he should not be required to occupy himself with two or even several at once. The German, on the other hand, interlaces his thoughts in tangled, nay, twice-tangled and once again tangled periods, because he wants to say six things at once, instead of producing them in succession. One has to read for some time without thinking of anything, or rather to commit the jumble mechanically to memory in the fond hope that a light will dawn upon one at the close. That is clearly vicious, and a gross abuse of the reader's patience. But the unmistakable predilection of commonplace minds for this style of composition is due to the circumstance that it forces the reader to expend time and trouble in understanding what he would otherwise have understood at once ; whence ensues the illusion that the writer has much greater profundity and intellect than the reader." Elsewhere he adds :—"The bulk of German authors would do well to persuade themselves that, as much as possible, we ought to think like great minds, but speak the same language as ordinary people.

Let us employ the usual vocabulary, and say unusual things." <sup>1</sup>

Another supreme ambition is—to write at all times "cleverly." Now pure, unmixed truth is never "clever." It is the possibly original, but individual and therefore ill-balanced view, the paradoxical, exaggerated delineation of a new aspect of truth that is what we term "clever"; and therefore, although very bewitching, cleverness is not generally of much service. Christ, who *is* the Truth, whose words are "spirit and life," who spoke on behalf of the whole human race, He who was "filled with the Spirit," never uttered a "clever" syllable. When such a man as Hegel was driven to confess at the close of his career that "only one of all his pupils had ever understood him, and *he* had misunderstood him," he passed a bitter condemnation on his entire philosophy! True wisdom is before all else intelligible. The Roman declared long ago that "simplicity was the criterion of truth." <sup>2</sup>

However, it is comforting to observe that genuine knowledge speaks the same language everywhere. A kindred dignity of spirit and grasp of facts and their causes, a like perspicuity and coherence, in point of observation and deduction, produces the same admirable diction in Macaulay, Thiers and Ranke. *Ce que l'on conçoit bien s'énonce clairement.*"

All phrases are dangerous, the scientific peculiarly so. We can habituate ourselves to believe that there is something really "contained in it." Who has not known people who had grown into scientific thinking-machines, lost to all sense of unsophisticated right or truth, and become unconscious that there is any higher occupation than the manipulation of juggling tricks and legerdemain with the instrumentality of scientific ideas?

<sup>1</sup> *Über Schriftstellerei und Stil.*

<sup>2</sup> Veritatis simplex oratio est.—Sen. *Epist.* v. 9. (E.K.S.)

The scientific phrase, like the rest, betrays a disposition to give oneself out for more than one actually is, in fact, a too obvious self-assurance. These pretensions do harm. Science has been too eager to conclude from what she knew to what she did not know, and has ever been dreaming that her extant scheme of knowledge was a "more or less" final one. Yet does not she too believe what she once denied, and deny what she believed? We recall how the great savants assembled at Salamanca demonstrated to Columbus by *their* science, from Aristotle downwards, that the earth was no globe, and that, even if it were, he might indeed sail down the one side, but would never be able to mount the other!

The science of the eighteenth century also cherished a proud consciousness of infallibility. What merriment the report then lately circulated of stones falling down from the sky afforded it! The *Académie des Sciences* of Paris pronounced irascibly in A.D. 1800 that the circumstantial details of such an occurrence were utterly incredible. Goethe himself relates that he had once participated in this derision, but before the close of his life took great interest in making a collection of meteoric stones. The same Academy refused to entertain any further communications with reference to magnetism, regarding it as pure deception. Yet under the new title of hypnotism it is now "scientifically" studied and publicly expounded by Professors Charcot, Bernstein, Forel and others. The Parisian astronomer Lalande, with calm superiority, frowned down the labours of Bessel on "luminous satellites" (i.e. double and triple stars), remarking, "We do not believe in such things!" There were German astronomers also who flatly scouted Bessel's discovery. To-day "double-stars" are amongst the most absorbing topics of scientific research. Even so competent an authority on marine organisms as Edward Forbes



taught fifty years since that at a depth of 1,000 to 1,500 feet all vitality, vegetable and animal, became extinct, because, on account of the enormous atmospheric pressure and unrelieved darkness, no life could subsist or develop there. *Now*, thanks to the investigations of the *Challenger*, we know that in much greater depths, indeed as far down as we have gone at all, a redundancy of delicate organisms exists, gorgeous with variegated, highly phosphorescent, green and red light of its own, in some cases furnished with gigantic eyes, in others with eyelets at the tip of long horns. Science is generally at fault when she denies. There is "helium" in the earth, life in the depths of ocean, and there are stones in the sky.

The foremost meteorologists had long controversies regarding the "*föhn*"<sup>1</sup>: some fetched it from the Sahara, others traced it to the Gulf of Mexico; till at last the story of the simple Swiss folk was believed, that it arose in Switzerland itself, just as the Norwegian "*föhn*" does in Norway. For a long time science ridiculed the tales of "ground-ice," found by fishermen and sailors, as a physical impossibility. Thus, as Arago pertinently remarks, had we never seen fish, we should have proved "scientifically" that living creatures could not exist in water, particularly sea-water, containing sodium chloride and iodine; and on the other hand, Flammarion points out that every philosophical fish must regard life out of water as self-contradictory. Had we no acquaintance with transparent substances, we should undoubtedly suppose that it was an inseparable property of hard, close-grained bodies to be opaque. Previous to its discovery by Professor Ramsay, nothing was surmised of argon, the fourth gas contained in air,<sup>2</sup> concerning which Dr. Müller writes in *Natur* :—

<sup>1</sup> A humid southerly squall prevalent on the Swiss lakes.

<sup>2</sup> Prof. Ramsay has lately traced three "companions of argon" (neon krypton and xenon) in the air. (E.K.S.)



“ Who would have suspected that, after air had been so frequently analyzed with the finest instruments, by the most scrupulously accurate chemists? Here is a case where we may truly say with Hamlet:—

“ There are more things in heaven and earth, Horatio,  
Than are dreamt of in your philosophy ! ”

A hundred years ago science knew nothing of electricity, a power which in another hundred will play the leading part in our globe, unless by that time we have discovered a new force, still easier of extraction from the sunbeams. If it had been told a scientist then that hundreds of horsepower could be transmitted to a distance of hundreds of miles through a copper wire, without moving it or even generating heat in it, or that a message could be sent across the ocean without any material conductor, he would have smiled sarcastically, and said that such an idea was in conflict with the most elementary principles of natural law. The learned judgments passed early in the nineteenth century by “specialists” for and against the introduction of railroads present a really unique spectacle of absurdity. Scientists treated Daguerre as feather-brained when he declared that he would not rest till he had fixed the “pictures drawn by the sun.” And so, immediately before the application of the spectrum analysis to astronomical purposes, the then famous astronomer Dove curtly dismissed Zöllner with the sentence: “What the stars are we do not and never shall know.”

And in yet more recent days how has science dreamt that the protoplasm of the ocean floor, whence all life drew its origin, had been brought to light in the form of Haeckel's “Bathybius”; and that we possessed the primeval organism in *Eozoon Canadense*,<sup>1</sup> and had found

<sup>1</sup> *Bathybius*, a slimy matter dredged up in cable-laying, was hailed by Haeckel and Huxley as the first form of life. But

an infallible panacea in Professor's Koch's tuberculine ! What has been the fate of this and similar triumphs of science ? Too often she strikes out new paths only to discover that they are blind alleys. When, on the other hand, Helmholtz published the law of the conservation of energy, discovered indeed by Robert Meyer, but more clearly surveyed and defined by him, " the most prominent physicists in Berlin gave a most unfavourable judgment of the work, pronouncing it to be a fantastical, if not absolutely absurd speculation ; indeed, the editor of the principal technical periodical of the class declined to endorse it." And yet this discovery now ranks as a proposition " the clear comprehension of which," as the same writer remarks, " must be esteemed as the greatest achievement of which science can boast since the discovery of universal gravitation by Newton." <sup>1</sup>

We have therefore good and valid reasons for not taking for granted all that this goddess Science avers, and for not repudiating on the spot all that at which she curls her lip. For she has not grown a bit more modest ; but, whilst haughtily entitling herself dispassionate, derides—and that without nearer scrutiny—every fact that does not fall in with her theories and systems, every fact for which she has not yet found any solution. When it is irrefragably proved, however, she takes the credit of the discovery. Thus she disposes of lunar influence and that of other orbs on the animal and plant world, although that influence reveals itself so predominantly in the case of the sun, manifests itself in the action of the moon on the tides, and must, therefore, be presumed by a sound philosophy to

it is now discredited, being pronounced an inorganic precipitate from the salt water in which the specimens were preserved ! The *Eozoon* is an Eozoic fossil dubiously conjectured to be a relic of animal life. (E.K.S.)

<sup>1</sup> Bezold : *Gedächtnisrede über Helmholtz*, p. 12.

exist in a less degree in the case of all the heavenly bodies;<sup>1</sup> for we still know as good as nothing of the electrical and other emanations of the universe.<sup>2</sup> Such a lunar influence is confirmed by many instances of insanity, and by the lunatics of the Gospels. The fishermen of the Mediterranean are well aware that, like the crab with us, the sea-

1 " These soft fires  
Not only enlighten, but with kindly heat  
Of various influence foment and warm,  
Temper or nourish ; or in part shed down  
Their stellar virtue on all kinds that grow  
On earth, made apter hereby to receive  
Perfection from the sun's more potent ray."

—Milt. *P. L.* iv. 667-73. (E.K.S.)

<sup>2</sup> Cf. a remarkable passage in Locke. "Had we such ideas of substances as to know what real constitutions produce their sensible qualities, we could more certainly find out their properties than we can now by our senses. But we are so far from being admitted into the secrets of nature that we scarce so much as ever approach the first entrance towards them. For we are wont to consider each of the substances we meet with as an entire thing by itself, independent of other things. But if we look a little nearer into the state of animals, we shall find that their dependence is so wholly on extrinsic causes and qualities that they cannot subsist a moment without them (e.g. the air). How many of these the severest enquiry cannot discover! Were this earth removed but a small distance out of its present situation, the greatest part of the animals in it would immediately perish. The qualities, observed in a lodestone must needs have their source far beyond the confines of that body, and the ravage made on animals by invisible causes, the certain death of some by barely passing the line show that the concurrence of bodies with which they are seldom thought to have anything to do is absolutely necessary to make them be what they appear to us. To understand aright the constitution of a fly or an elephant, perhaps we ought to look beyond the sun or remotest star our eyes have yet discovered. Perhaps things in this our

hedgehog there, dwelling deep down in the black *paille de mer*, inaccessible to moonlight, is fat and edible only when the moon is in crescent, and almost empty whilst she wanes. The remarkable effect of Röntgen rays on bacilli furnishes us with an instructive analogical process.

Present-day science likewise scorns homœopathy, in spite of many facts that bear witness to the effect of inappreciable doses of matter. A thousand-millionth part of a cubic millimeter of a dark red aniline solution acts upon the optic nerve, and less than a billionth part of musk on the olfactory and other nerves. The old axiom of Laplace and Bertholet that "an atom or molecule set in motion by any force can impart its own motion to another atom in contiguity with it,"<sup>1</sup> is sufficient to defend homœopathy. Yet homœopaths and allopaths, "nature-doctors" and anti-vaccinators, are still bitter enemies, and bring accusations of gross ignorance and reckless homicide against one another; a proof how far we have advanced in the domain of medical science!

Science likewise despises for the most part the presages and symbolism of dreams, and thinks that she accounts for them by "reflex motion of the nerves," and other meaningless formulæ. She makes light of vision, prophecy, possession, apparitions, magic, etc., though she has nothing to oppose to the universal belief, the thousands of attested narratives, and the witness of Scripture, but the senseless dictum: "It is impossible; since I disbelieve it!" For,

mansion would put on quite another face, if some one of those great bodies incomprehensibly remote from us should cease to be or move as it does. This is certain: things, however absolute and entire they seem in themselves, are but retainers to other parts of nature for that which they are most taken notice of by us."—*Essay*: Book iv. c. 6. (E.K.S.)

<sup>1</sup> Liebig, *Chem, Briefe*, p. 289.



with all her alleged and vaunted impartiality and claim to be superior to all prejudices, she nevertheless has her tastes, her fashions, her attachments, and is governed by those powerful intellectual impulses which drive whole generations now in one direction, now in another. It would be a mistake to think that man bases his scientific or other convictions, in general, on facts studied impartially and at leisure. The tendencies of the mind prejudice a question before examination, and influence the inferences from it. Champfleury used to say of art that an oak tree was not the same thing to a realist as to an idealist. So the majority of men are swayed by conscious or unconscious predilections, which determine for their minds the value and significance of observed phenomena.

To profess belief in the supernatural is, we are told, "a disgrace to the twentieth century." Now, how opposite are people's points of view ! I for one am of opinion that an element of superficiality and precipitation, a temper inclined to dismiss, not seldom with virtuous indignation, all that which lies beyond its own horizon as "crass superstition," ranks amongst the many blemishes of which the age ought to be ashamed. Numbers of well-meaning but ignorant Christians share this perversity. But, to be sure, to prate incessantly of all manner of golden, purple, and azure hues to a colour-blind community is bound in the end to provoke moral irritation !<sup>1</sup>

I have said, "to *profess* belief in which is a disgrace." For, as all civilization is a lacquer or varnish, concealing from us the nature of the wood underneath, so the present fashion hides beneath a triple coat of "illumination" a

<sup>1</sup> We have a right to expect from an (alleged) "unprejudiced, liberal spirit of research" that it will not make a jest of phenomena of which innumerable instances are on record amongst all nationalities, and to which nothing is opposed but a stolid, unmeaning negative.

layer of superstition, even amongst educated people, thicker and grosser almost than ever before. The sneering at such things in broad daylight is on a par with the ill-disguised cowardice of boys whistling in the dark. That is where the ghosts have their revenge ; he who makes fun of them in a brightly lighted drawing-room is panic-stricken if he has to wend his way home at midnight past the churchyard : of which interesting tales might be told. Much might be said of the superstition of princes and kings, their consorts and their court-train, of the daily card consultations of the free-thinker Gambetta, the talisman of the aristocratic, " refined " gambler at Monte Carlo and elsewhere, the dearly paid for slipper of a female suicide, a blood-stained bank-note, a piece of the halter from an execution : of the superstition of the irreligious members of the Berlin Stock Exchange, who base their speculations on the grey, black, or dappled colour of the horse of the first mounted policeman they meet, of geomancy, of reversed paternosters, and amulets on sale in many towns, of sympathetic charms, and philtres employed by many educated, and alas ! so-called " Christian " people ! Any one familiar with these facts knows what to think of the assertion that superstition vanishes before enlightenment.

Superstition is the grisly shadow cast on our path by the viewless wings of the powers of darkness, the " spirits of the air " that environ us round and lurk ever in ambush for us : the ineradicable presentiment of a great, insoluble, mysterious concatenation of all creatures, binding us and our fate by invisible links with the greatest and minutest, the nearest and most remote existences in nature, and of its eternal relation to the two conflicting principles of conditioned and unconditioned being. And because this is true, however confused, inconsecutive, apparently senseless and imbecile the individual perception may be, no enlightenment, no preaching even, suffices as an

antidote, but only, as Jacob Boehme says, "a resort to the heart of God, to take refuge there from the Satanic tempest."

Yet should an inventive brain examine certain of these phenomena scientifically in ten or twenty years' time, dub them by a Greek name, and present them as the "fruits of the latest research" (as has been done in the case of hypnotism, known to the Egyptian priests of old, and employed as a method of therapeutics<sup>1</sup>), it will straightway become the fashion to believe and to be interested in them, just as it belongs to "good tone" at present to make fun of them in polite society. Shame on our frivolity and vacancy of character!

#### V.—ITS CRITICAL PRETENSIONS.

We might ignore the critical bent of science, since that is occupied properly not with nature, but with history. Nevertheless, it forms, at the present day, an integral part of all the sciences, and reaches out so far towards the Creator and the creation that we are compelled to notice it.

Criticism, in some degree, impartially conducted and within moderate bounds, may be a good thing; and yet truth has always vindicated itself without such aid by its very persistence and verification. But Biblical criticism especially degenerates at present, as a rule, into such a warped, one-sided negation, that it renders a sceptical and critical demeanour towards this criticism a positive duty. For it certainly does not err on the side of modesty. The self-assurance with which it razes (to its own satisfaction) all that former generations built up, denies what they affirmed, and vilifies what they prized, is unexampled; and so is the complacency with which it claims to tender a remarkable service to humanity by showing that it has hitherto been fed on lies, that its heroes were dwarfs, its saints hypocrites, the history of the world a tissue of fables, and

<sup>1</sup> Vide Plotinus, Book ix.

its mythology a baseless invention ! An astonishing thing, by the way, on this hypothesis, that the Egyptians, Greeks and Romans should have been satisfied with it for so many ages !

It is true, and it is much to their credit, that the ancients did not recognize criticism as a special department of knowledge.<sup>1</sup> Of course they employed it, as every sensible man does. Aristotle criticized Plato, and Plutarch his great men and their history ; and in default of the facilities provided by the press, and of our means of communication and research, they did not fail to remark now and then that they were recounting a story that had been told them, and did not vouch for its truth. For they were less pretentious than we are. Nowadays historical criticism generally, and Biblical criticism in particular, advances with a front of brass, remodelling history after Wellhausen's pattern to suit its purpose ; and has learnt to fathom the acts, nay the thoughts of the Prophets, far better than they understood them themselves. It is able to unveil the most abstruse motives of these great men—and the motives it assigns them are invariably paltry—and to evince " incontestably " that Paul did not say what he meant to say, and even that our Lord did not understand His age or His own claims. And as this style of criticism is easy work, and effrontery is always " imposing," and seeing that there is uncommon satisfaction in pulling down something, *at any rate when a man has not the mental vigour requisite for building up*, our modern Vandals, English and German, set to work with no half-heartedness, and write learned books to prove—one

<sup>1</sup> The names, however, of Zenodotus, Aristophanes of Byzantium, and Aristarchus, will occur to the reader. But this was in a period of decadence ; and to some extent, no doubt, an artificial outcome of the foundation of the Alexandrian library and the stimulus furnished by the patronage of the Ptolemies. (E.K.S.)



that the Trojan war is the northern saga of the rape of the Virgin of the Sun transplanted to Greece ; and another that Jacob, his wives and his twelve sons are a personification of the year ; for is it not clear as daylight that Napthali stands for January, and Asher for December ? whilst a third wiseacre has made the discovery that the forty-fifth Psalm is a hymn composed by an eunuch in honour of Ptolemy Philadelphus ! But the Solomon of the party is unquestionably the gentleman<sup>1</sup> who informs us that an unknown Jew began to write the Book of Daniel in the month of January, 164 B.C. ! All this may be very fine, but it has no pretensions to the name of science, much less of history.

We hardly know whether to marvel more at the braggadocios of the teachers or the credulity of the taught. It is obvious that there is no historical fact on which doubt cannot be cast by such methods, no historical figure which cannot be dissipated in myth. Yet even the downright materialist, Vogt, foe of all dogmas as he is, admits that " a doctrine, be it ever so dilapidated, and seamed with gaps and crevices on every side, cannot be looked at as if it were compounded of mere air, vapour and mist : facts are always to be found from which the myths have started."

Forty years ago criticism was confident that there had never been a Homer nor a Troy, and even in 1872 the name of the former was held by Rieke to be a Graecised noun of multitude from the Celtic *omar*, a " collection " ; but then came an ignorant amateur named Schliemann, who said

<sup>1</sup> Kautzsch. It is a ludicrous example of the vagaries of criticism that Prof. Hommel has lately expressed his opinion that the bulk of the book of Daniel dates from the Persian era, that the " West Aramaisms " are Babylonian, and that the Greek musical instruments named (the mainstay of the critical attack) were all borrowed by the Greeks from Babylonia or Phoenicia (Vd. *Theol. Lit. Blatt.* 28 March, 1902).  
(E.K.S.)

little, but dug deep, and unearthed Troy and Mycenae ! The worst of it is that he has persuaded some conscientious critics that both Troy and Homer really existed.

It may not be amiss to conjecture how critical research will one day deal with us people of the twentieth century, if indeed it busies itself with us at all ! Anyhow, it will evaporate us into mere shades and phantoms, myths and allegories. Should the world still be standing in 3000 A.D., and if, as is not unlikely, social cataclysms and terrible wars, or perhaps a Chinese and Mongol invasion, shall then have played havoc with European civilizations ; and if (of which we see symptoms already) the world's memory grows shorter and shorter, and our products, books and photographs less and less durable, Macaulay's famous New Zealander, or possibly Australian or Japanese, after taking an instantaneous photograph of the ruins of London and Berlin, will be able, on returning to his native land, then presumably at the head of civilization, to deliver an interesting lecture on the " Teutonic Goethe-myth." What more easy than to prove, to begin with, that Goethe can never have existed at the opening of the nineteenth century. " For gentlemen," the lecturer will say, " there is not a vestige to be found in his writings of the conflict then demonstrably raging between his fellow-countrymen and their ancestral foe, the Gauls. This *soi-disant* national poet utters not a syllable of exhortation to his warring and dying compatriots ; he has no inspiring message calculated to incite his nation against the foreign tyrant who had enslaved them. More than that. You will search his extant works in vain for that name which was then resounding through the length and breadth of Europe. This Goethe is not aware of the existence of a Napoleon ! Yet the tradition relates not only that he was living at this very date, but that he was minister of state to one of the princes engaged in the struggle. Fables like these do not deserve serious examination ; they

cannot abide the touchstone of criticism one moment. In short, gentlemen, if you will permit me to present to you in brief the fruits of many years' research, you will agree with me, that we have no need to conceive of a historical personality as embodied under this name at all. The name itself (of which Gothe is the correct form) on rigorous scrutiny turns out to be an old tribal designation of the Germans. The collected works of Goethe ascribed to this man (*Gesamtwerte von Goethe* ; according to a newer reading, *Werke, gesammelt vom Gothen*, 'Works, collected by the Goth') betray such varieties of view and of intellectual standpoint, and moreover, spite of successive 'redactions' in later times, of language and style, that we can identify nothing with the name Goth, but the *genius of the Germans*, a people celebrated as thinkers, in the variety of phases which each tribe passed through during the course of centuries."

"Let us examine the fragments still extant that are ascribed to this mythical author. *a.* In the popular ballad, *Erkönig*, everything wears the stamp of primitive barbarism. Primeval man still wanders through the night in constant dread of dark, destructive powers of nature, which he personifies, solicitous only for the preservation of his material existence and the propagation of the species. We observe here only father and child, the family in its simplest expression ; no state as yet exists, and the complete omission of the mother indicates unmistakeably the subordinate status of woman. In coincidence with the oldest historical data, the horse is the sole domestic animal mentioned. The concluding expression, 'The child was dead,'<sup>1</sup> supplies a striking refutation of the contention of certain idealists, according to which the immortality of the soul was an idea coeval with humanity. This primitive man, gentlemen, was not aware that he had a soul ; and

<sup>1</sup> The last line of *Erkönig* is

"In seinen Armen das Kind war todt."



unnumbered centuries must have elapsed before he could acquire that metaphysical conception! We can therefore hardly err in assigning the poem to the primeval epoch of this people, and conceiving of the unknown author as a cave-dweller subsisting on acorns and horse-flesh, and living in habitual awe of the elementary powers of nature.

β. "The tone of the next picture is less sombre. The allegorical poem of *Hermann*, or 'German,' and *Dorothea*, (according to a more recent and better reading '*Dothea*,' or 'Gothea,' i. e. the female Goth), belongs to a later age, and was originally composed by the priesthood, but bears evident traces of several, relatively speaking, later recensions, interwoven with the earlier ethical maxims. It depicts the peaceful union, after ages of conflict, of the two peoples, Germans and Goths; nor does it lack incidental pictures of an agreeable stamp representing a civilization already territorial, and familiar with trade and agriculture.

"γ. The fragment of *Götz*, of which but little remains, is a remarkable contrast. Here a haughty and cruel tyrant is figured, apparently by a contemporary, his ferocity being symbolized by the 'iron hand,' which is clearly attributable to a primitive mode of expression, but has been taken literally by some childlike commentators!<sup>1</sup> We know nothing further either of the forgotten author, or of the chief figure of the drama, who is plainly non-historical.

"I will not weary you by a minute examination of all the pieces in this national anthology. The last and most remarkable that has survived and been attributed to this Goethe, Gothe, or Gott (i. e. 'deity')—for the ideas themselves seem to have evolved independently of the etymology, and there remain authenticated vestiges of a 'Goethe cult'—is a duplex work δ, the second half of which, of a date

<sup>1</sup> Götz "of the iron hand" is a knight of the Empire of Maximilian's days, who, having had his right hand shot off, wears an iron substitute. (E.K.S.)



in any case centuries subsequent to the other, is almost un-animously regarded by the latest criticism as a continuation of the former. In the First Part, the hero of which betrays his purely mythological ancestry by his very name '*Faust*' (meaning Force or Violence, as may be seen from '*Faust-recht*,' a barbarous usage of that age), there is manifest a distinct relapse into savagery. Gloomy superstition alternates with contempt of science ; there are diabolical apparitions ; magic and witchcraft are still believed in ; the language is uncultivated and at times distinctly sensual. Hitherto, accordingly, the origin of this work has been placed decidedly later than  $\alpha$  and  $\beta$ , yet not anterior to  $\gamma$  ; but since recent research has disclosed to our view a so-called 'dark middle-age,' with whose characteristics the First Part strikingly accords, criticism has pronounced that the substratum of this partly historical, but in many respects interpolated, poem dates from about the year 913 A.D. Unfortunately we can discover nothing of the unknown author of the work, formerly ascribed to 'the Goth,' but, as we now know, by mistake.

" In the Second Part the infantile and crude conception and images are refined and etherealized into philosophical allegory by a far later hand ; the language is much more scientific, and consequently harder to understand ; the author no longer credits the vulgar superstitions which disfigure the First Part : in short, the whole exhibits an advanced stage of intelligence and mental culture. Thus, in contra-distinction from the more fabulous First Part, an historical, though circumscribed value cannot be entirely denied to the Second, at least in as far as the figures of the Emperor and his court are concerned. It is a problem not yet finally resolved by our scientific authorities whether one century would suffice, or whether several would not be requisite, for this most significant process of refinement.

" And so, gentlemen,"—thus will the esteemed professor

conclude his equally interesting and instructive address,—“ the torch of critical research has succeeded here, as elsewhere, in shedding light on the obscurity in which, through the lapse of centuries, this mythical figure of the “ Goth ” had been wrapped, and in identifying it with a personification in all its successive phases of the reflective genius of this nation, once so powerful, but now defunct ! ” (Sustained applause !)

In a similar fashion, no doubt, some ambitious youth will graduate with a thesis in proof that the gigantic figure of Bismarck, its slouch-hat (manifestly borrowed from an old deity, “ Odin ” or “ Wuotan ”), and its big dog (originally wolf) was nothing else than an old emblem of the severe northern winter. He will point out his incessant animosity against a certain “ Napollo ” or “ Apollo ” (the prefix “ n ” at that time denoted pure negation or “ defeat ”), who was worshipped in the remotest ages as the sun-god of the south, being supposed to emerge from an island in the east, and sink westward in the ocean. His twelve “ marshals ” plainly represent the twelve months ; and symbolical statuettes of him, with star or sun on the breast, and the mystical semi-circular head-gear which typifies the solar orbit, are still found here and there. He will describe how after long warfare this northman or god of winter leads away his enemy captive, and a popular festival is celebrated in commemoration of this event at the beginning of winter (2 Sept.). He will then notice the numerous inconsistencies in the “ most untrustworthy documents ” surviving, and how the same figure appears at one time in the garb of an insignificant Northern squire, at another as a ruler of the nations ; now as the object of universal execration, now as the idol of his day ; at one time as the friend and guest of Apollo, and again as his bitterest foe, invariably according to the season of the year ! He will

remark, moreover, how he is found first in the *rôle* of friend and counsellor, then as embittered opponent of a certain Emperor Wilhelm, himself varying from a white-bearded old man (Winter) to a fiery youth (the succeeding Spring) ; and will solve these apparent, because literally construed, discrepancies in an allegorical and highly imaginative manner to the perfect satisfaction of his audience. Lastly, he will show that this figure of Bismarck, originally representative of winter, slowly assumed another aspect, being fused in the popular consciousness with the typical champion of the national spirit victorious over its ancestral foe. " This mythical Prussian squire, raised by tradition to the dignity of a national ruler, whose birth-place is fixed in Pomerania, merges finally in the figure of the once insignificant Prussia, which at that epoch developed with extraordinary celerity into a great Power ; and this type of the German character is endued by the popular fancy with all the qualities that are characteristically Teutonic, as is evident from the voracious appetite and still greater thirst attributed to him, his gigantic lead-pencil, fabled to be a foot and a half long, his elongated pipe and beer-can, yet ever combined with the foregoing conventional slouch-hat and dog traceable to Odin," etc.

This young man, it is to be hoped, will take his degree amid general plaudits after an exposition so completely satisfactory, based on the most painstaking historical researches !

A very modest outlay of sagacity and a small infusion of imagination only are needful in order to construct these choice amalgams of tradition and fact by judicious combinations and omissions, so as to bring out of them what suits us best, whatever makes for our system or falls in with our predilections.

The trick may be managed even more neatly. There



are no prophecies, we are assured, because . . . why, there are none! Wherever then a prediction meets us, it is "a later interpolation"; and since from whence is "uncertain," we fulminate in this style: "The unknown author of this demonstrably later insertion," etc. Such a manipulation is obviously quite "guileless and bland"; yet there are people who regard the manoeuvre as "scientific!"

The true principle of criticism would be that we are bound to admit whatsoever we have no substantial reasons for doubting, just as we ought to hold a man honest until we have some proof to the contrary. Now the Higher Criticism reverses this rule; its principle is that it is obligatory to suspect all that we have not good reason for accepting. It disbelieves in advance; and its present endeavour to drag down every great personality to its own low level, to impute petty, selfish, ambitious and covetous (if not worse) pretexts for all magnanimous and gracious deeds, and to father on the chief figures of history, sacred and profane, every conceivable foible, proved or putative, is indeed a dreary spectacle. The evil perpetrated is immense. People are more and more educated and confirmed in the belief that for four thousand years they have been systematically gulled and deluded, first by the Bible, and next by every historical authority. Ages after ages have men, the best and wisest of men, been wholly unable, it would seem, to discriminate between gross imposture and truth; whereas, in reality, everything, particularly everything lofty and sublime, is grounded more or less on falsehood, and genuine wisdom consists in scenting everywhere deliberate duplicity or self-deception! A pitiable and most bigoted position, which can only mature as pitiable, unwholesome fruits!

There are moral laws and analogies, probabilities and harmonies, great waymarks and sequences in history, which are far more significant guides to its true under-



standing than gaps in the records eked out with ever so much acumen, or contradictions in the documents (as if the world and the life of every individual were not full of contradictions !), sources of dubious authenticity, or even loose statements of contemporaries possibly ignorant of the facts, or misinformed, or unfavourably disposed ;— means by which criticism not seldom hastily presumes to give the lie to thousands of coinciding voices for as many years, to the *consensus gentium*, and the verdict of mind and heart. For, in spite of all its assumption of sagacity, critical unbelief is generally marked by a lack of genuine insight and want of appreciation of truth and weight of evidence, by an incapacity to distinguish the accidental from the intrinsic, or to recognize the moral interdependence, the logic and justness of things. We see on every hand how little talent and force of character are requisite to the formation of a sceptical scholar, unable to descry the rock for underwood and weeds, or the forest for the trees.

To hold that there never was a William Tell or a Virgin of Orleans, or that Shakespeare did not write his plays himself, apart from all other disproofs, is a psychological insanity, a persuasion which only men who have no criterion of truth within their own breasts could espouse. It is the common destiny of these people at last, out of pure dread of being victimized, to victimize themselves, and fall a prey to every critical imposture. Not only is the love that “believes in goodness” a more sublime wisdom, but God takes care that it shall have enough to exercise its faith. Doubtless, there is an enormous deal of swindling and imposition in the world ; but let us not forget that there is still more sincerity. Falsehood floats on the surface, concerned chiefly with the fleeting and the frivolous ; but in the depths the foundations of the earth repose on truth ; otherwise, how could it endure ? God

ordains that rectitude eventually secures its due in spite of many unrighteous individuals; and so He provides that humanity shall not batten exclusively on the garbage of lies; else how could it survive at all? It is a part of the superintendence of Providence that the fundamental verities of history should be conserved for our benefit. All discoveries and inventions of man are adjusted in a marvellous fashion to his prevailing moral state and requirements. Thus, in counteraction of a criticism that would render the entire story of the past one monstrous fabrication, Providence has provided during the last century, by a strange series of circumstances, for the resuscitation of that past from its ashes. The cairns and barrows, the cave-remains and lake-dwellings, the princely vessel of the Viking, the galley of Tiberius; Egypt and her religion, laws and customs, the palaces and libraries of Babylon and Nineveh, the Circensian games and domestic life of Troy and Pompeii,—all these rise from their long sepulture to vindicate the veracity of the ancients. The facsimile of the Biblical narrative and the Homeric epic meets our startled gaze. Even old Herodotus, with his African pigmies, his labyrinth, his dolphins trained to catch fish, and other tales of the kind, has not played us false!

#### VI.—ITS CIRCUMSCRIBED DOMAIN

That Science has its place in human life we gladly concede; for the capacity of knowledge is one of the finest gifts lent by God to men, and a just employment of this great talent has wrought great and happy effects. But none should claim more than their due. When we survey the course of history, we discover, not without some surprise, that science has never been an influential factor therein, nor ever raised or ruined an empire. It was not by the aid of science that Alexander, Caesar, Tamerlane or Attila, much less Buddha or Mohammed, subdued the

world. It was not science that brought about the migrations of nations or the Crusades, the Reformation or the French Revolution. Neither the Napoleonic nor the German empire arose by its instrumentality, nor will the "universal war" and "social crisis" that menace us be obviated by science, nor won or decided thereby. It is not of science that the poets to whom the world has hitherto turned a willing ear have sung; not science that embellishes youth, or invests woman with her spell, or age with its pathos. The fountain-heads of life take their rise elsewhere. Now the "spirit of the time" sighs softly through the lands like some Aeolian harp, now clamours aloud, a presage of evil surging through the forest, now swells unawares into a storm, a tempest, a hurricane, sweeping the nations before it like sapless leaves. Sometimes the Spirit of God breathes from the four winds on the dry bones, and they revive, and become a great army of witnesses for the truth. At another time, a spirit of dizziness and delirium seizes a nation, and it sets itself to dance ecstatically round "trees of liberty," quaffing draughts of blood the while; then, when the tempest is laid, gazes in wonder at its own handiwork, and cannot tell whence the spirit came or whither it has fled. "This Samson," says Matthias Claudius, "does not waste time in critical inquiry, whether the bolt and lock of the door are fast, or of what wood its leaves may be made, whether native oak or not, but riotously tears up gate, cross-beams, posts and all, and shoulders them up the mountain!"

But when the life of the spirit, "the divine frenzy which is better than sober reflection,"<sup>1</sup> languishes, we sit ourselves down in nonchalance at our writing-table, and

<sup>1</sup> κάλλιον μαρτυροῦσιν οἱ παλαιοὶ μανίαν σωφροσύνης τὴν ἐκ θεοῦ τῆς παρ' ἀνθρώπων γιγνομένης.—*Plat. Phædr.* XXII. The summary of Plato's ethics on p. 266 is not a direct quotation.



show very adroitly that there is no such thing as spirit or storm or hurricane, that these are the ravings of the "unconditioned," the blusterings of the "world-idea!" And those who know no better cry forthwith "by the space of two hours:—Great is Diana of the Ephesians!"

Science then, is not indispensable. Every one may see how many an honest burgher and noble-minded lady, day by day, without science, does good, aye and great deeds, that excite our heartfelt esteem. The Hebrews and the Romans in the days of the Republic, the Persians of the era of Cyrus, and the Germans of Tacitus were moral and contented without science, and so are the frank, sturdy, honest, shrewd and quick-witted mountaineers of Bavaria and the Tyrol, Norway and Switzerland to-day. And even if we leave the men of the Bible, those fishermen from the Lake of Gennesareth who vanquished half a world by the preaching of the Cross, out of account, there have ever been great men who have not been learned, the saints and benefactors of their kind, the heaven-taught artists and the warriors of brass who proved a buckler to their fellows in the day of need and stress. Tyndall himself acknowledges candidly that "there is a thing of more value than science, and it is nobility of character"; and to think what is true, feel what is beautiful, and wish what is good, is Plato's definition of a life of reason.

Science does not replace love, faith and hope, those forces that move the world; and mighty as she is, cannot comfort man in the face of death, nor give him felicity in this life. Nor can she make him better either, however much her ennobling, moralizing influence may be lauded at educational congresses and the like. Science is a force like gunpowder or electricity, a power such as wealth, and in itself as little moral or immoral, noble or base, as electricity or money or gunpowder. He who is moral



uses his science or his affluence morally ; he who is immoral, immorally. The case of Communists, Russian Nihilists and Anarchists, who are frequently scientifically educated men, exemplifies this. Doskojewsky notes with respect to the criminals (nearly all murderers) in Siberian Ostrog that "half of the population were educated, and could read and write excellently," and adds, "Where could two hundred and fifty men of all ranks have been found elsewhere in Russia, the half of whom could read and write ?" It is an alarming fact that, in spite of compulsory schools, the latest educational systems and newest methods, as already mentioned, the number of juvenile offenders has increased in Germany fifty-one per cent. during one decade ! In Australia matters are even worse. These are results which no fine phrases about progress at pedagogic congresses can salve : in this department more than in any other the maxim holds : "By their fruits ye shall know them." The chief question is not what we teach our boys and girls, but what they grow up to be ; not what they know, but what they are. The catalogue of the double stars renders no man honest ; to be acquainted with the laws of physics is no warrant of truthfulness ; nor does applied mechanics ensure to a man an affectionate or humble disposition. In place of brand-new theories, recent systems, and psychological and sentimental addresses and resolutions, let modern education give us scholars, who, like the youth of ancient Persia, "fear heaven, revere their parents, and speak the truth,"<sup>1</sup> and we will believe in it !

No. Science and learning by themselves cannot make men better, and the expectation that the spread of popular education will curb the high tide of socialism more

<sup>1</sup> Herodotus (I. 136) substitutes the use of the bow for the second of these qualifications, but veneration for parents is referred to in the context. (E.K.S.)

and more discovers its foolishness: most socialists and anarchists are now better taught than the old-fashioned country-folk who retain their religion and loyalty. Mere knowledge is not wisdom, a thing we are ever forgetting in the present day.

Even in practical life science is not all in all. Long ago men came to the conclusion that knowledge and capacity are two different things, that if learning and talent coincide in many instances, they are not necessarily synonyms. Mother-wit and presence of mind, coolness and resolution are often better qualifications than a large stock of knowledge; in short, the problems of life cannot be unravelled in a study. The Germans are certainly the foremost of nations in regard to science and philosophy; yet, in return, the unskilful German scholar has become a proverb, and the Colonial Englishman judges correctly and hits the mark point-blank, without *doctrinaire* education or scientific equipment.

Religion and education are not sciences the study of which is an indispensable preliminary to salvation or a complete school curriculum. That would be a mournful prospect for millions of poor and uninstructed people, who would yet fain reach heaven and bring up their children aright. But, as that profound thinker, Pascal, says, "Religion is God brought home to the heart,"<sup>1</sup> and true education means primarily a natural system of instruction. Fear of God and a mother's love are spiritual treasures, or rather gifts from heaven, exalted high above mere science. The greatest men of God, the patriarchs and prophets, did not make religion a scientific study, nor were these men, or Christ Himself, brought up pedantically, but conformably to natural principles. How many a mother by no means "scientifically" taught, has trained

<sup>1</sup> "Voilà ce que c'est que la foi parfaite; Dieu sensible au coeur."—*Pensées*, II. Art. XVII. 62. (E.K.S.)

her sons to be good and great ! For there is an intuition, and spiritual eye for and sense of truth and right that is not dependent on the tedious and halting rules of deduction and exposition. Only in the realm of intellect is science supreme ; she is an intruder in that of the soul, the spirit ; and therefore it is that so often ladies destitute of scientific attainments demolish with a word your formal Dryasdusts. Much, doubtless, can be learnt from educational and religious text-books, but never has a teacher or man of God been moulded thereby out of one who was not such by the grace of God already.

One word more on " popular science," an expression which passes sentence on itself ; because the popular mind is not scientific, nor the scientific popular. Well-intentioned *littérateurs* who are ignorant of the masses, and philanthropists who are not aware what science is, would do well to remark this fact. For science a man must have a bent, as much as for art, and the former talent is much rarer probably than the latter. The first requisite is a strong hankering after causality. The mind to which it is a matter of indifference why the apple falls, and the pendulum swings isochronically, is not scientifically endowed, though its possessor may be genial, shrewd, practical, an excellent citizen, father, husband, friend and Christian, which is of far more importance. In the second place, a capacity for sustained, concentrated thought is demanded ; for reflection, it may be for years, on an apparently insoluble problem of which other people do not see the importance, is the true scientific temper. Lastly, a studious, persevering familiarization with the elements and radical laws of knowledge. The average man lacks the first two requisites, and has no time to acquire the last qualification. We have all had opportunities of observing how the auditors at most popular scientific lectures have retained nothing the next morning



except a string of witticisms which evoked "much amusement." The sensible, sober workman prefers spending a hardly earned respite from work in his quiet domestic circle or in the open air to these diluted doses of popular science and treacle ; and he is right !

Certainly we are in favour of the dissemination of a solid, useful, coherent knowledge of geography, history and natural history, in respect of which it might be said of our present style of school-education : less attempted, more done ! Of what service to the ordinary man, however respectable in his calling, who is engaged in business or trade, are the dynasties of the Pharaohs, or the details of the War of the Spanish Succession, or the designations of the Graian and Cottian Alps ? or an acquaintance with the teeth formation of swine, or the percentage of nitrogen in beans, or the delusive tables of relative nourishment ? A thorough knowledge of a number of serviceable facts, however, is not science ; that begins with the inquiry into causes, and the discussion of the intellectual value of facts. "The roots of phenomena," says Tyndall, "are imbedded in a region beyond the reach of the senses : and less than the root of the matter will never satisfy the scientific mind." A nation of scientists, if such a monstrosity were possible, would be as mournful, because unnatural and therefore deleterious a phenomenon, as a nation of landscape painters or jurists. Wholesome and needful as salt is to man, he is far from being able to subsist on a diet of salt alone.

But if any one wishes to test the real condition, spite of popular lectures and cheaply retailed science, of that "widespread education" on which we plume ourselves, he should take up a position on the pavement of one of our great cities, and accost the first ten dandified coxcombs who are sauntering, cigars in their mouths, to the theatre or a club, elated with the consciousness that



they belong to the twentieth century, that age of enlightenment and progress. I do not intend that you should press them with scientific questions about the embryogeny of the rabbit or the theory of the polarization of light. No. Put a very few questions to them about heaven and earth, what surrounds and concerns themselves, on topics that should interest and be of moment to every man. Ask them, to begin with, as is fitting, what they think of God and their relationship to Him. If they reply that there is no God, inquire of them in what way they suppose this world to have originated. Should they say, "Of its own accord," ply them with the simplest of questions affecting the universe in general; ask about the sun or the earth, why we see only one side of the moon, why the days wax and wane, why it is warm in summer and cold in winter? If they cannot explain that, come down to our own planet; propound a few queries about the sea or ships, and how they use the wind to sail against it; or about mountain ranges, of what rocks and strata the hills of their native soil consist, and whence its numerous fossils come; ask about the gills of fishes, how the hard shells of mussels grow, about beetles and caterpillars, trees and horticulture; or about the bones of their own bodies, and how many of them they possess. Supposing they should tell you that town-dwellers cannot be expected to be well versed in natural objects, make some inquiries of these citizens of the State concerning politics and religion, seek for information regarding the powers of Parliament and who is eligible for it, or what their privileges and obligations as German citizens are, what are the laws under which they live, what is allowed and what prohibited, in what the constitution of the German Empire consists, and, since they still term themselves Lutherans, about the articles of the Augsburg Confession. Should they respond that they are more familiar with practical matters,

then examine their knowledge of building, or landscape-gardening, or electric traction or turbines, or ask how the locomotive draws an express, or about the recent developments of telegraphy, what a "gas-motor" is, or their notion of the telephone of which they make daily use. Question them, in fine, in reference to the world or nature, the past and present, geography or botany, art or literature, painting or architecture, philosophy or psychology,—it matters little which. Their replies, if you are fortunate enough to extract any, and they have not long ere this consigned you and your queries to the devil, will open your eyes to the actual range of knowledge among the "educated classes."

#### VII.—ITS CONSISTENCY WITH CHRISTIAN FAITH

How indefensible and misleading is the position that knowledge and faith are incompatible, is evinced by the names of great students who have been earnest Christians too; for faith is no foe to knowledge, which it neither curtails nor obscures. It is in itself inconceivable that belief in God or in the immortality of the soul or in redemption and remission of sins should disqualify a man for a keen and accurate observation of nature. The materialist has no fee-simple of scientific truth that we Christians should not be competent to probe it as well as he. There is no field that does not stand equally open to us; we too can make sagacious deductions and syllogize correctly, erect scientific hypotheses and systems, or test their validity; the belief that surmounts these things does not exclude them. I cannot discover in the least why religious convictions should incapacitate me for detecting, by lenses of an immersion system,<sup>1</sup> new stripes on the

<sup>1</sup> This expression refers to an arrangement by which a liquid is introduced between the front surface of the objective (i.e. the lens or lenses serving to bring the rays to a focus)

*pleurosigma angulata* or *surirella gemma*, or debar me from sketching by the aid of the telescope exact maps of the double canals in Mars, or, like Secchi and Liebig, from casting penetrating glances into the world of constellations, or the no less mysterious world of atoms. Experience rather shows that Christian faith is favourable to an extensive survey and accurate appreciation of fundamental principles. Even the historian of materialism prudently admits that the "most profound students, the discoverers and inventors, the first masters of science, are not wont to occupy themselves with the promulgation of materialistic doctrines."<sup>1</sup>

Many sceptical minds have rendered important service to all branches of knowledge, as specialists in particular, yet the labours of eminent Christians, who have been at the same time pioneers in science, have been more revolutionary, more far-reaching, and have diffused the beams of knowledge through a more extended circle. Their enumeration is nothing new, but we shall continue to repeat it so long as our opponents raise a clamour in the world by the false statement that faith is the enemy of science; for this assertion is thus signally refuted. To name but a few instances of Christian scientists. Our thoughts revert to *Copernicus*, the founder of our modern system of the universe, a man of unfeigned piety, on whose grave are traced the words:—"Not that grace which Paul received crave I, not that favour with which Thou didst pardon Peter: that which Thou didst grant the malefactor, that alone I beg"; and to *Kepler*, whose laws, together with those of Newton, form the basis of modern astronomy; who winds up his chief work with the noble

and an object, for the purpose of correcting the refractive action of the glass, allowing the object to be held farther off, and admitting a longer range of "penetration." (E.K.S.)

<sup>1</sup> Lange : *Geschichte des Materialismus*, II. 140.



thanksgiving :—" I praise Thee, O Creator and Lord, that Thou hast vouchsafed me this joy in Thy creation, this delight in the works of Thy hands. I have proclaimed the glory of Thy works to men, in so far as my finite mind could comprehend Thine infinity. Where I have said aught unworthy of Thee, or have sought my own honour, of Thy mercy forgive me ! " We recall the name of *Newton*, who is well known to have been a zealous and devout reader of the Bible, as well as of the mystic Boehme, and never made mention of God without baring his head, and of whom Liebig says that " from a single exalted genius more light has emanated than the preceding thousand years had kindled." <sup>1</sup> *Linnaeus*, whom Professor Fraas terms " confessedly the first naturalist of all time, the creator of the science of natural history," <sup>2</sup> when he discovered the formation of leaves, exclaimed transportedly that " he had traced the footsteps of God." The founder of palaeontology, *Cuvier*, according to Quenstedt the greatest zoologist for two centuries, was a believer in Scripture ; and *William Herschel*, possibly the most brilliant of astronomers, affirms that the more the field of science expands, the more numerous and irrefragable do the proofs for the eternal existence of a creative, almighty wisdom become. We remember that " profound thinker," *Leibnitz* (to borrow the description of Dubois-Reymond), who composed the hymn—

" Jesu, Whose death and passion  
Our life and gladness is ! " <sup>3</sup>

and the great mathematician *Euler*, who wrote in the year 1767 a *Defence of Divine Revelation against the Objections of Freethinkers*. *Lavoisier*, who by his discovery

<sup>1</sup> *Chemische Briefe*, p. 4.

<sup>2</sup> *Vor der Sinflut*, p. 501.

<sup>3</sup> " Jesu, dessen Tod und Leiden  
Unsre Freud' und Leben ist ! "



of oxygen and oxidation laid the corner-stone of modern chemistry,<sup>1</sup> and of whom Büchner says, "Our entire modern conception of the world hinges on the law of the conservation of energy, together with the principle of the conservation of substance discovered by Lavoisier,"<sup>2</sup> writes in his *Traité de Chimie* :<sup>3</sup> "Together with light God spread over the earth the principle of life, sensation and thought." Liebig himself, the prince of German chemists, ungrudgingly and gladly confesses his belief in God in his *Chemische Briefe*, and declares that "the great value and dignity of natural science consists in the fact that it is a stepping-stone to true Christianity."<sup>4</sup> We think too of the illustrious but devout astronomer Secchi, and of Mädler, whose book bears the motto, "The heavens declare the glory of God," who maintained that "a genuine student of nature could not be an atheist, for natural and divine laws are one and the same"; of the words of the first of geographers, Ritter, that "the world everywhere overflows with the glory of the Creator"; and of the great electrician Faraday, who was not above conducting Bible readings. We are reminded lastly of the historian Ranke, among whose papers was found a prayer concluding, "Almighty, One and Triune God! Thou hast called me out of nothingness; here I lie at the footstool of Thy throne!"

How many men of science might be instanced besides, who at the lowest estimate were serious and devout men, such as Descartes, Haller, Bernouilli, Brewster, Biot, Ampère, Quatrefages, Agassiz, Clerk Maxwell, etc., and finally, Robert Mayer, discoverer of the unity of forces, the greatest scientific fact of the last century, who declared to the

<sup>1</sup> "Since the discovery of oxygen the civilized world has undergone a revolution in manners and customs."—Liebig.

<sup>2</sup> *Die Chemischen Elemente*.

<sup>3</sup> p. 20.

<sup>4</sup> *Chemische Briefe*, pp. 6, 41.

physicists assembled at Innsbruck :—"From the depths of my heart I proclaim that a genuine philosophy cannot possibly be anything else than a prelude to the Christian religion." <sup>1</sup>

In view of such facts, instead of reviling us as "reactionaries," the materialist ought to thank us handsomely for the radiant torches which we Christians have kindled for his service, without the light of which he would still find himself centuries in arrear.

The scientific capacity of Christians shines with an even brighter lustre when we bear in mind how small a minority they form in the world. It is no exaggerated computation that non-Christians out-number Christians in Europe by a hundred to one. When we ponder this disparity, we are bound to affirm that a few Christians have contributed far more to the study of nature in recent centuries than a host of unbelievers. Faith qualifies a man to understand nature far better than scepticism. Where then does the cherished argument that it is the foe of science find support ?

From these instances there is deducible the corollary that Christian belief, like science, is grounded on clear, tangible facts. It is, to be sure, a favourite supposition at present that it is possible for a man to be at once great and mean, sincere and insincere, a hero and an impostor, a commanding figure in one sphere, and in another a veritable noodle. The prophets and apostles, for example, despite their outstanding personalities and prominence in history, despite the potency of their victorious witness, were (it is contended) half-irresponsible fanatics, incapable of discriminating between miracle and the plainest natural occurrences ; or notwithstanding the beauty and sublimity of their moral doctrines, arrant rogues, who simulated divine miracles which never truly happened, such as

<sup>1</sup> *Die Mechanik der Wärme*, p. 318.

the resurrection of Christ, to hoodwink an ignorant populace. We do not question that a great mind may make mistakes, but we do not believe either that it can think profound and logical thoughts on one theme, and confused and shallow thoughts on another. We do not believe that so majestic and perspicuous a mind as Newton's imbibed of a sudden as his religious creed any kind of preposterous stuff, like some weak-minded child ; but we conceive that he exercised his piercing judgment here as elsewhere. After all, neither Paul nor Augustine, Luther nor Pascal, were *exactly* the men to accept things quite at random without examination.

It is astonishing how many a Christian listens with bowed head and perfectly submissive mien to an opponent who twits him with the scoff that his is a surreptitious faith, "dependent entirely on emotions, on a more or less obscure state of feeling, and not, like science, on evident, indisputable facts," etc. To begin with, it would be at least curious and scientifically inexplicable, that a "hole-and-corner" faith should have changed the world, and forced the nations that stand at the head of the race, at any rate nominally, to profess themselves Christians. Did the apostles at Ephesus or in the Agora at Athens, or before the High Priest at Jerusalem, or face to face with Roman proconsuls and Caesars, slink away from the light of publicity ? Did Calvin at a later day in Geneva, or Luther at Worms ? Are sentimental phrases the salient characteristics of Paul's epistles, or do they not rather embody in the strictest logical form a lucid apology for the gospel against Jews and Greeks alike ? There is but one answer to these questions.

The Christian religion is now predominant from the north to the south pole, from east to west, and whether we land at Spitzbergen or the Cape of Good Hope, the crosses on the graves remind us that there also men believe,

or give themselves out as believers in the Crucified. Does nothing underlie so transcendent, nay, unexampled a feature in the world's history? Was it a mere phantasmagoria, a dream, the trances of self-deluded enthusiasts, that turned the ancient world upside down, and diffused a fresh system of thought over the globe?<sup>1</sup> Is it conceivable that the thousands of Christians who have preached the gospel since the days of the apostles, with all modern missionaries—men like Egede, the apostle of Greenland, Gützlaff in China, Zinzendorf, Williams, Krapff, Moffat, and their successors, the living embodiments of self-denial and self-surrender; traversed heathendom, battled with hunger and thirst, brooked countless hazards and privations, and in many cases suffered horrible deaths, merely with the deliberate aim of besotting these poor wretches, prepossessing them against the light of knowledge, and fastening on them sacerdotal shackles? Miserable imputations these, which stand self-condemned!

Here and there, it is true, a delusion has achieved some apparently great result; but, when calmly reviewed, it has ever been seen to be the ingredients of truth in it that have lent it strength. So it was in the case of Mohammed, whom many, on the strength of legends of later growth, judge too severely, that Moses, self-commissioned, whom Providence gave to the wild Ishmaelitic scion of Abraham, to snatch them from idolatry and moral perdition, and to extirpate in after years heathen nations and scourge

<sup>1</sup> "Non disse Cristo al suo primo convento :

Andate e predicate al mondo ciance,

Ma diede lor verace fondamento :

E quel tanto sonò nelle sue guance,

Si ch' a pugar, per accender la fede,

Dell' Evangelio fero scudo e lance."

Dante : *Paradiso*, xxix. 109-14. (E.K.S.)



a degenerate Christendom. His announcement of the one God who created heaven and earth, and will one day judge the world, and description of Him as the Merciful ; his injunction of justice, prayer and almsgiving ; his declaration that what God sends, be it death or aught worse than death, is best ; that sentence, *Allah akbar !* God is great !—these were truths which put the sword into his hand with which he vanquished millions, and in two centuries spread his teaching from Delhi to Granada. The unmixed lie, however, the mere negation, is both barren and impotent. Let a man attempt to achieve some world-wide result by the proclamation that two *plus* two does not make four ! As Carlyle observes :—" A false man found a religion ! Why, a false man cannot build a brick house ! If he do not know and follow *truly* the properties of mortar, burnt clay, the laws of statics, etc., it is no home that he makes, but a rubbish-heap ! It will not stand for twelve centuries, to lodge a hundred and eighty millions ; it will fall straightway."<sup>1</sup>

But, like science, Christian faith rests on clear facts,<sup>4</sup> facts that daily repeat themselves, and can be recognized without difficulty by every impartial arbiter. Is it not fact, and is not every stone church in village or town, as well as the great cathedrals of Ulm or Strassburg, Cologne or Milan, Durham or Rouen, not to name St. Peter's at Rome, a mute yet eloquent witness to the truth that, without arming a single man for the undertaking, without

<sup>1</sup> *Hero Worship*. (We confess that we dissent from this estimate of the False Prophet, whilst fully agreeing that he was raised up to chastise an idolatrous Christianity. There is a certain truth in the dictum, "*nec simulatum potest quicquam esse diuturnum*," as Cicero has put it (*De Off.* ii. 12) : but in this fallen world there is also what Bacon calls "a natural though corrupt love of the lie itself," which perpetuates a profitable imposture, in which "inversion becomes the order of nature." (E.K.S.)

inscribing a line, or expending a single piece of money, an unknown carpenter's Son who traversed a remote province of the Roman Empire for two or three years, accompanied by beggars and fishermen, rejected by his own countrymen, amid the obloquy of the rich, learned and powerful of mankind, and at length underwent an infamous death, has by a few sentences subjugated the world? A testimony to His Godhead so impressive to the mind of Napoleon, that it led him at St. Helena to the confession that Jesus was in truth the Son of God. Conformably to the eternal, unalterable law of nature on which men of science dilate, "*causa aequal effectum*," that the cause counterbalances the effect, the Cause of so stupendous an effect, namely Christ Himself, must have been inexpressibly mighty.

Who will champion the creed of materialism, the eternity of matter or the evolution of the primordial cell, in an analogous fashion, resorting only to the same weapons as Christ employed, and let us see what will come of it?

Is it not also an historical, authentic fact that thousands of martyrs have died under torture, and millions of Christians in ordinary circumstances still die daily, joyful and confident, nay radiant through faith in their God and Saviour, although they too, like other men, are attached to wife and child, life and earthly possessions? It is therefore incontestable that when the Gospel is believably embraced there enters into or is quickened within the heart a power not present before. For this reason the Roman proconsuls could not sufficiently marvel at the Christians whom they racked. One of them who was not able to extort from a youth expiring in agony a solitary groan of anguish exclaimed, "*Victi sumus*,—We are conquered!" The display of a power which sobers the roisterer, purges the vicious character, tames the arrogant and reforms the thief, is cognizable, an irrefutable, "sci-

entific " fact ; and it is wholly unscientific to brush aside this phenomenon curtly as an illusion or hallucination. Indeed, a man who does not flinch from denying the momentous effects of faith in history is not to be argued with.

Power is power, and that which is of a spiritual order is, most of all, obedient to definite laws, does not arise causeless, nor vanish in air. Here too we may affirm that " there is no effect without a cause," as there is no cause without an effect ; and science must learn to acknowledge the unrecognized but real cause at work in conversion, instead of contenting herself with merely supercilious detraction. Wherever a power appears in nature, we can only bow before the patent fact ; then it is open to us either to leave it alone and pursue our way, or to study the manner of its occurrence and its consequences ; to inquire into its cause or causes.

A scientific fact, say our adversaries, must be capable of reproduction at any time, and subjection to examination. Irrespective, however, of the very partial truth embodied in this allegation, for it is valid only within the range of human experiment, I inquire with what right the genuineness and veracity of facts of daily recurrence, tested a thousand times by myself and thousands of Christians besides, can be disallowed. We bear testimony that we constantly experience joy, consolation and strength in answer to sincere prayer, and that many a time definite, sometimes immediate, fulfilments of our petitions are granted us. If the unbeliever alleges that he has never encountered anything of the sort, the question ensues whether he has put it to the test, and that agreeably to all the necessary conditions, without which not even the scientific experiment will succeed ; else he is incapable of judging whether there is any truth in the matter or not. And even if he should declare that he has put the thing to the test and with no effect,



that is as little proof that *I* am deluded as the assertion of a colour-blind man that he has frequently looked through a prism without perceiving any of the brilliant colours of which I report to him that I observe them unfailingly. The fault lies in his eyesight, not in the ray of light.

"Blind faith!" cries the blind doubter, unconscious that faith is a luminous vision of a higher world, shrouded from the gaze of unbelief. Faith is intuition, and intuition, as our daily life and history instruct us, is higher than deduction. But "faith often leads astray." Ay, false faith, certainly, and even more often scientific proof. How much that is erroneous and untrue, how much sheer nonsense has been and continues to be dexterously and "fairly" demonstrated! The ancient sophists were not unaware that everything, and withal nothing, may be proved!

The realm of faith resembles the canopy of clouds that float high in air, serene and buoyant overhead, shifting in form and yielding in consistency, intangible and yet real, above the solid, firm-fixed earth, freely wafted hither and thither, and towering in the flush of sunset into palaces of gold and purple. Many disparage these aerial visions, and "to live in the clouds" sounds a futile existence in the ears of the worldling who is immersed in the stern prose of the "battle of self-interest." But unless this upper world distil upon the rugged, iron-bound earth beneath its beneficent emanations, its fructifying showers, what avails the utmost pains and labour of the husbandman? Rifled of these ethereal effluxes, we are bereft of life, we droop and wither. Yet when they break loose irresistibly, and blasting lightning-strokes descend amidst the crash of thunders, and the waters from above swell and seethe and rave over forest and plain, obliterating man and his works, this august power, resident so far above his every-day self-confidence, crows the spirit even of the worldling.



None but the morally blind can ignore the tremendous effects of faith as a divine, and unbelief as a diabolical, agent in human history. The inspired penman illustrates the former for us in the epistle to the Romans ; the latter has engendered in all ages the persecutions of Christians, and the exacerbated hatred with which present-day materialists and anarchists likewise strive to eradicate all faith. This too is a testimony to its power ! The chafing, jostling tides of belief and unbelief have ever fomented the contentions of mankind ; for Christ says : “ I am not come to bring peace on earth, but a sword.” In tracing this historical antagonism to the conflict of two mighty spiritual principles it seems to me that we are acting more scientifically than does the materialist when he treats faith as mere delirium, and accordingly ascribes these vast effects to bare hallucination ; as if such a nullity as that could have stirred the world, and convulsed mankind !

We Christians explain the order of the universe by conceptions which our opponents themselves confess to be admissible, such as the postulate of a living and personal God, the efficient *Causa causarum*, who created this universe out of His own infinity. If Professor Haeckel “ shrinks from the recognition of the ultimate highest Principle,”<sup>1</sup> he thereby confesses that there is such a principle, and this very Principle we designate Deity. Lange further observes, “ Professor Haeckel treats spontaneous generation as an indispensable, though unconfirmed hypothesis. Those who do not accept that hypothesis must have recourse to the miracle of a supernatural creation.”<sup>2</sup> Then, inasmuch as Pasteur, Dallinger and others have conclusively disposed of spontaneous generation, we are following the above advice, and acting with strictest scientific propriety in embracing the doctrine of a supernatural creation.

<sup>1</sup> *Natürliche Schöpfung*, p. 28.

<sup>2</sup> *Geschichte des Materialismus* : ii. 235.

We maintain besides that somehow and at some time an aberration of the creation from its Creator has taken place, and that in consequence of this separation from the source of all light our spiritual life has been sullied and obscured. On the one hand our recognition of the first elements of the creation within and without us is impaired, and on the other a shadow is cast over life by a latent consciousness of its departure from rectitude. Uninspired philosophy comes to the same conclusion. Even Buddha says, "This is *Sansara*, the world of birth, age, and death; it is the world which should not have been," and Schopenhauer, who at other times rails at the Bible, makes the confession that "it is the history of the Fall that reconciles him to the Old Testament; for our existence resembles nothing so much as the consequences of a false step or a criminal cupidity."

As the primary cause of the misery of human life, under the burden of which all generations have groaned, and of which even Homer sings :

"For of all things that breathe and creep the earth  
No creature lives so mere a wretch as man,"<sup>1</sup>

we adduce the doctrine of the divine Nemesis that pursues guilt—a doctrine maintained by all the great masters of tragic poetry, and by all who have been deeply versed in the knowledge of human nature. They one and all acknowledge that

"Of all good things the greatest is not Life,  
But of all human ills the chiefest Guilt."<sup>2</sup>

---

<sup>1</sup> οὐ μὲν γάρ τί που ἐστὶν διζυρώτερον ἀνδρὸς  
πάντων ὅσσα τε γαῖαν ἐπι πνέει τε καὶ ἔρπει.

—*Il.* xvii. 446, 7.

<sup>2</sup> Schiller : *Die Braut von Messina* ., *sub fin.* :

"Das Leben ist der Güter höchstes nicht ;  
Der Übel grösstes aber ist die Schuld."

That fear and anguish of which Schelling says that it is the deepest experience of every living creature, we refer to the existence of a wicked power perpetually menacing us with destruction, "going about as a roaring lion seeking whom he may devour." The materialist, on his part, can offer no interpretation of this deep-seated unhappiness of man. We explain the far-reaching prospective correlations of the universe, which materialists themselves have often admitted, by the sway and sovereignty of an Almighty God, who has His own designs in view. Is not that conviction more natural, satisfactory and fitting, and therefore more "scientific," than to regard them like Spiller, as the "handiwork of an unconscious, yet wise, just and infallible universal ether?"

Of Death, that awful apparition, which the Greek declared to be the most terrible thing in the world,<sup>1</sup> and on which science can shed no light, we say with the Bible: "Death is the wages of sin, but the gift of God is eternal Life"; and in this accord with the wisdom of all nations!

Here again Schopenhauer gives his suffrage in our favour by acknowledging that "death proves that our very existence itself implies guilt," and adding, "nothing is more certain than that it is the deep sinfulness of the world which occasions its many and great sufferings."<sup>2</sup>

With what right then does that world cast on us the imputation of believing without knowing, and boast that it knows and does not believe, and yet does not know how the grass grows or why the worm dies? Science adduces the dogmas of the mathematical axioms, of the atomic theory, of vital energy, to elucidate the configuration, properties and phenomena of bodies; and so, in order to

<sup>1</sup> Ἀίδης τοι ἀμείλιχος ἢ δ' ἀδάμαστος.  
τοῦνεκα καὶ τε βροτοῖσι θεῶν ἔχθιστος ἀπάντων.

—Hom., *Il.* ix. 158, 9.

<sup>2</sup> *Par. et Prol.* xiv.

(E.K.S.)

explain the equally incontestable, absolutely assured, else inexplicable facts of remorse and stings of conscience, fear of death, cry for redemption, conversion, answers to prayer, and peaceful deathbeds, do we assert the doctrines of divine holiness, of sin, of a Saviour Jesus Christ, of redemption by His death and of everlasting blessedness. Thousands of earnest, highly-intellectual men, such as the above-named scientists, such as the noblest saints of Church History, and multitudes besides, have borne witness, and so do many still, that they have found after thorough, lifelong research that doctrinal Christianity alone offers any competent explanation of the universe, and of human life ; indeed, very many of them have joyfully sealed that persuasion with their blood.

Or are we Christians, and we only, unwarranted in making inexplicabilities the basis of our cosmology ? Are we not rather compelled by the strictest scientific rules to hold fast these " theories " of ours—let our adversaries still term them such as they will—till they provide us with a better philosophy of the world in which we live ? But how little their explanations explain ; how " scientifically " defective their views are, how precarious their conclusions, and how much blind belief they exact, how sterile their doctrines have ever proved in the life of the individual and in the history of the race, will appear from the next chapter.



## CHAPTER V.

### Materialism

“ Epicurus’s atoms, those almighty tools that do everything of themselves without the help of a workman ! ”

RICHARD BENTLEY : *On the Folly of Atheism.*

#### I.—IT CANNOT EXPLAIN PHYSICAL PHENOMENA

WE pass now from Science to that cosmology that is so widely diffused in certain circles under the name of materialism, a view long ago broached by Democritus, and which many mistakenly regard to-day as the very quintessence of science.

The materialist avers that nothing but eternal, indestructible matter exists, together with its embodiments or “ forces ” ; that even the highest forms of life are nothing but such embodiments of matter. The universe is thus reduced to a motion of atoms ; all discovery to a discovery of atomic mechanics. Further, he says that matter explains itself, and therewithal interprets all the phenomena falsely attributed to spirit. The theory of spirit is accordingly superfluous, and, in common with other superfluities, injurious. A position at any rate alluring in point of simplicity ! But whether it corresponds with the world of facts, whether matter does “ explain itself,” and not rather, even in animal pain and maternal affection, point to something higher, whether it interprets the imaginations and aspirations, the achievements and ideals of man’s inner life, we shall now proceed to canvass.

On inspection of this opinion, as propounded by Büchner, Vogt, Huxley, Moleschott, Spiller, Haeckel, and others, and accepted by a large number of people, we soon perceive that we have to deal not with pure science, concerned only with definite data, and the impartial investigation of nature within the bounds assigned by Dubois-Reymond, but with a tissue of science and speculation, with a system that may be described as the religion of unbelief. Indeed, two champions of this school published their lucubrations not long since under the title: *A Naturalist's Confession of Faith*.

It is remarkable that this foe of all religion sets in the forefront of its philosophy of the universe, the religious, although negative, proposition—"I believe that there is no God." This assumption is in no wise scientific, but a dogma destitute of proof, and supported by no facts whatever in nature. Verily, it would require a lengthened research into chemistry and geology, astronomy or zoology, spectrum analysis or micrography, a very protracted scrutiny of the world through microscope and telescope, to find one object, one configuration of matter—and the materialist believes in nothing else—which demonstrates that no God exists.<sup>1</sup> What could this object be? How can the existence of a thing both positive and definitive prove the non-existence of a Being independent of it? It would have been strange that so many illustrious Christian students had never stumbled on such a fact or facts, and it is even more significant that no materialist has ever been able to adduce one explicit phenomenon of natural science in proof of the foregoing assertion! We shall not enumerate here the numberless utterances of wise and great men, in which they have acknowledged in every age with Humboldt that "the

<sup>1</sup> "They that deny the divine existence assume the attributes of deity."—John Foster: *Essays*. (E.K.S.)

world's history is unintelligible apart from a Governing Power," but confine ourselves to maintaining the proposition that the postulate "there is no God" cannot be scientifically proved.

Yet, inasmuch as the decree, "Thou shalt worship!" is engraven in the depths of man's soul, materialism straightway proceeds to set up a dead deity in place of the living God of Scripture, and proclaims as its creed:—"I believe in eternal Matter, from which all powers issue, which has of itself created all things, which knows nothing, and nevertheless comprises in itself all possible knowledge."<sup>1</sup> And with the very same fanaticism and intolerance for which it reprimands "clericalism," it claims unquestioning faith for this idol of its own. Let us hear how Spiller, whom Dr. Müller describes as "one of the foremost of natural philosophers," expresses himself regarding this deity of his, Primordial Matter, which he entitles "Unversal Ether." The italics are his. "God is an infinite, eternal, e.g. uncreated and indestructible, *material substance*, namely '*Universal Ether*.' This is the *creator* of the heaven (e.g. 'heavenly bodies'), and of the earth; it has also *created us men*; it rules the entire world; it is *eternal, omniscient, righteous, unerring* and alone *infallible*, because it acts *without self-consciousness and without predeterminate purpose*. . . . *The soul is the reciprocal action of the atoms of the organized body and the universal ether*."<sup>2</sup> All this is simply asserted. Spiller then expresses the hope that by this discovery of the ether of the universe he has settled the "parsons' business,"

<sup>1</sup> "It is not now of wood and stone that men make their idols, but of their own abstract conceptions. Before these, borrowing for them the attributes of personality, they bow down and worship."

—Duke of Argyll : *Reign of Law* : p. 113. (E.K.S.)

<sup>2</sup> *Gott im Lichte der Naturwissenschaften* : pp. 84, 120.

and censures other materialists for making visible, gross matter the source of all. Büchner's dictum, "Matter is the all-engendering, all-reassuring parent" is to him an utterly inadmissible heresy, and he says, "When Diderot assumes that matter thinks, all our thoughts are paralyzed."<sup>1</sup> He makes a jest of the altogether inconceivable "unconscious will" of Hartmann, "that substratum of spirit, not yet arrived at self-consciousness, on which everything rests for its attainment of consciousness," as a baseless dream; and flippantly cries, "Most material spirit, be so good as to remove thy mask!"<sup>2</sup> Hartmann in turn affirms that matter is a chimera.<sup>3</sup> So we have dogmas against dogmas.

But the article of the materialistic creed relating to the eternity of matter is no less unscientific than that regarding the non-existence of the deity. Not only is it incomprehensible and indemonstrable, but it is repugnant both to our instinctive impressions and the logic of facts. The universe, like a child in process of growth, or a plant recently budded, bears rather the stamp of incompleteness and juvenescence, of an aspiration towards an end not yet attained. Besides, the materialist teaches that millions of years ago all matter, according to the hypothesis of Herschel, Laplace and Kant, was equably distributed in a marvellously attenuated form throughout space; and that we look upon the undeveloped embryo of the universe when we turn our gaze to the nebulae removed from us thousands, perhaps millions, of years in the scale of time that light takes to travel thence to us. How does such an origination of things harmonize with the eternity of matter? The materialist is perpetually repeating that man has evolved from an animal condition in comparatively few millenniums, and that the earth is a relatively recent

<sup>1</sup> *Das Leben*: pp. 21, 67.

<sup>2</sup> *Ibid.*, p. 11.

<sup>3</sup> *Philosophie des Unbewussten*: Chap. vii.



body in course of development. But are not an eternal condition and evolution mutually exclusive? If we were shown a child and told that it was growing day by day and had been doing so from eternity, we should at once ask why it was not yet grown up. If we have already been developing from all eternity, why are we not yet developed? If it is everlasting, all potentialities in the conformation of matter must have been exhausted eternities ago.<sup>1</sup> Indeed, all forms of existence must have repeated themselves to infinity, and I must have been seated at the same table an infinite number of times already composing and writing these identical paragraphs. For though matter may be regarded as infinite *quantitatively*, yet by the laws of nature it possesses only a finite number of *qualities*, and therefore can assume only a finite number of phases. But facts refute even this wholly purposeless unending reiteration, which is the logical corollary of the eternity of matter. What we term life in the universe is the interaction of forces incessantly seeking equipoise. This equipoise is continually being adjusted, e.g. by the perpetual radiation of hundreds of millions of suns, diffusing warmth which never returns to them into the icy realms of space. If that has been occurring from eternity, why is not universal space long ere this uniformly warmed, and why have not

<sup>1</sup> "There are discovered by the telescope masses of nebulous matter, all probably destined to become systems like our own. Now the matter of which they are composed has, according to the materialist, been in existence from eternity. What has retarded the formation of these masses or determined their various stages of progression? In every case, adopting the mathematical notion of chance, the probabilities were immensely in favour of the commencement of the process many times over before that period when it began. In fact, the doctrine of the eternity of matter is fatal to the doctrine of evolution." — Wilkinson: *Modern Materialism*: Present Day Tracts, xvii. pp. 32, 4.

all the phenomena of heat long ago subsided into quiescence? Yet admitting the attainment of a perfect equilibrium, the materialistic dogma of immobility, or the final disintegration of the universe, stands in contradiction with the hypothesis. For this immobility must have taken effect already; and had it ever done so once, it is impossible, in conformity with the law of the *vis inertia* of bodies, that matter should of itself have passed from a state of equipoise to that of motion.

Some cosmologists indeed describe to us how converging suns may ultimately combine, by the very force of their impact translated into heat, to produce a glowing, nebulous mass, and thus restore the archaic heat; whereby the process of world-formation may commence afresh. But these are fallacies. One chief source of heat, though it is very questionable whether that is the sole source, is probably the coalition of material masses. Granting that the moons should fall into their planets, the planets into their suns, and the suns into other suns, such a catastrophe would not happen simultaneously, but in successive stages. If Mercury fell first into the sun, and acted as fuel to that forge of heat for 6 years 219 days, as Lord Kelvin calculates, still at the termination of that period this heat would be dissipated by radiation and volatilized in space without raising its temperature a thousand-millionth part of a degree. Venus would succeed Mercury, and conserve the solar heat for 83 years 326 days, the earth again would sustain it 95 years 19 days, the gigantic Jupiter for fully 32,254 years, etc. The accession of all the planets would, however, only prolong the solar heat a space of 45,600 years. But in the long intervals between each absorption the sun would give out far more heat than the total sum of its revenue; so that, pursuing this hypothesis in thought, we find that the heat generated by the diminution of distances and fusion of these bodies

would evanesce perpetually in space; and if the suns, already brought into proximity, ultimately united after their moons and planets had been consumed, the chief portion of the capital of heat needful for the origination of a new universe would have been antecedently absorbed and as good as wasted. Accordingly, after a brief coruscation of millions of burning suns (not excluding for that matter the formation meanwhile of smaller nebulous clusters destined to a similar catastrophe), the universe must finally stiffen into ice and everlasting torpor in a void of space in that case congealed only to some —150 degrees Centigrade, instead of —273 degrees! Now if such is the scientific culmination of the universe, and matter is eternal, we ask once more why matter has not long ere now died this its natural death.

The eminent astronomer Secchi employs the same argument. "We have by no means to do," he says, "with a positively illimitable duration. Were that the case, the activities of the world would have been exhausted long ago. The cause of these vicissitudes is the different degree of energy in different regions of space. Since this energy is ever in quest of equipoise, that general equilibrium would have been reached, and all phenomena be rendered impossible, if an unlimited period had really elapsed already."<sup>1</sup> Even Von Hartmann admits as much. "It would consist little with the theory of evolution to assign to the processes of nature an endless duration in the past, because in that case every conceivable evolution must have already run its course, which is certainly not the case. As little can we allot to them an endless future duration; for the idea of any goal of this evolution would thus be cancelled, and the operations of nature resemble only the water-drawing of the Danaïdes."<sup>2</sup>

<sup>1</sup> *Die Sterne* : p. 335.

<sup>2</sup> *Phil. des Unbew.* : p. 747.

Many a materialist therefore acknowledges that this universe is the outcome of a finite development, and that the existing state of matter and natural forces must have had a beginning and implies a conclusion. That is the Biblical doctrine; and a more scientific postulate than that of the eternity of matter, because more consonant with the general aspect of the world, is afforded us in the declaration that "in the beginning God created the heavens and the earth." To Christians the Godhead is the Centre of Power from which the forces of the universe incessantly emanate and by which they are constantly impelled. He is the *Perpetuum Mobile* of the world; and therefore we have no need to fear the establishment of an equipoise of all forces, or the subsequent universal petrification.

Besides, before decreeing the eternity of matter, the materialist ought logically to tell us what matter is, that wonderful, familiar, yet unknown substratum, his sole entity, his "one and all." But he cannot give us the information, because he is no wiser than we who are not materialists. His altars, like those of the Athenians, are erected to an unknown god. Some scientists indeed aver that the notion of matter can be elucidated by the principle of energy already promulgated by Robert Mayer, and that in the conception of "universal energy" all that is necessary to the comprehension of material things is presented to us. But, so long as he walks on earth, man can never exhaust that idea. What he beholds and handles is not "energy," but matter, and the question perpetually re-arises what that matter is. We have seen that Dubois-Reymond pronounces his *ignoramus* to be the verdict of science here.

Glancing again at the materialist's confession of faith, we next meet with the article: "I believe in the eternity of forces or of force." Yet he himself confesses, with



every student of nature, that we do not know what "force" or "forces" are, and just as little whether they inhere in matter or not. Spiller says, "My standpoint is not the false position of Moleschott, Büchner and others, according to which common matter has lodged within it the principle of force and motion."<sup>1</sup> Elsewhere he remarks that Spinoza is in error in postulating the indiscerptible unity of matter and force; that a deeper study of the problem convinces us that energy does not inhere in matter as an inalienable property. What then is force? Dubois-Reymond, as previously remarked, thinks that is a thing we shall never ascertain here below, and even regards it as possible that neither matter nor energy exist, but are mere abstractions. But how can eternity be predicated of an unknown thing, whose nature is undiscovered, an abstraction which exists solely as a conception in my brain or an inference from my senses?

We see indeed that on earth, and also throughout space such force is indestructible; but this fact relates only to the present order of things, and is no pledge for eternity. It is truly laughable that creatures who exist here scarcely a second of celestial time, a nonentity measured against eternity, should stiffly maintain that matter and force are everlasting. How did we find that out? What do we fugitive and transitory apparitions comprehend about eternity, that magnitude inconceivable to our lilliputian minds? To introduce infinity into our calculations is to desert science for metaphysics. All things are at once possible in conjunction with this unascertained, incommensurable factor: a microbe with such an ally may devour the universe! This dogma of the eternity of matter evidently lacks scientific foundation, and is nothing but a convenient evasion, a pillow for the brain fatigued by reasoning. When the mind cannot discern or under-

<sup>1</sup> *Das Leben* : p. 40.

stand a beginning, or does not wish to believe in it, it declares that "things are eternal"; and regains its tranquillity.

The assumptions of materialists regarding the genesis of life are equally unproved. To the very question what life is they return anything but satisfactory answers. "Life in the widest sense of the term," says Spiller, "is motion, or local permutation." Certainly a vague definition enough! To Professor Haeckel vital energy is the simple law of causation, or the immediate outcome of the existing "material" of the individual. Who can comprehend that definition? Bernard in his speech at Chicago (1874) defined the principle of life as "that something which causes plants to grow." Plain, but no explanation! Hartmann requires in a vital evolution that "the metaphysical subject of the action should be immanent in the process itself as the channel of its statutory systematic development!" All life is nothing but "will" with Schopenhauer. Whose will? Herbert Spencer defines life "the continual agreement between internal and external relations"; to which we might make rejoinder that it much rather consists in a combat with these relations and a perpetual conquest of them. But we all feel that life is neither a mere adaptation nor a mere resistance, but a personal force ever individualizing according to its own innate principle.<sup>1</sup> Finally, if in response to this query, it be answered, in common with Spiller, that "the student who stands on the highest platform of natural philosophy will at once reply that life is nothing but motion,"<sup>2</sup> and

<sup>1</sup> "Life consists in a permanent influence over a perpetually changing set of particles."—Whewell: *Philosophy of Inductive Sciences*, ii. 43. (E.K.S.)

<sup>2</sup> *Natur*, 3 Feb., 1895. "If any degree of motion can beget cogitation, surely a ship under sail must be a most intelligent creature, though while she lies at anchor those faculties be

further that "natural science has had to travel a long way in order to be able to give this response," we can only regret that it has journeyed so far to no purpose; for life is as little pure motion as motion is intrinsically life. A dynamo replete with force, heat and electricity, emitting sparks and revolving many hundred times per minute, is for all that dead. But the black seed of corn that has lain for months on my window-sill seemingly dead, though perfectly motionless, lives. And so, too, the *rotifer* that remains quite stationary, numb, arid, and to appearance dead, during weeks and months in the gutter, is alive. And what are we to think of the vitality of microbes such as those exposed unharmed by Professor Pictet to a cold of  $-200^{\circ}\text{C}$ , a temperature at which the strongest acids will not act upon metals? These microbes subsequently came back to life, and seemed rather stronger than before! A strange victory of spirit over matter!

It is not many years since almost all physiologists, confident that organic forces in nature were the same as inorganic, believed that vital energy could be dispensed with as a superfluity. A reaction, however, has recently set in, and vital force come to be respected again. Professor Carrière observes well that Robert Mayer's law of the conservation of energy is not valid in the realm of life, where organic or mental powers are the sources of energy.<sup>1</sup> Bunge says: "The more deeply, comprehensively and thoroughly we endeavour to scrutinize vital phenomena, the more we come to perceive that circumstances which had appeared to be capable of a physical or chemical solution, are of a far more intricate character, and for the

asleep; cold water may be phlegmatic and senseless, but when it boils in a kettle it has wonderful heats of thinking and ebullitions of fancy!"—Dr. Richard Bentley: *Boyle Lectures on the Folly of Atheism*, p. 53. (E.K.S.)

<sup>1</sup> Lecture at Munich, 1892.

time defy elucidation." Indeed, capillarity and endosmose yield no explanation of the process of nutrition in plants, nor of their discrimination of noxious from beneficial elements, nor yet of their transformation of the latter into marvellous products of all sorts, nor of the metamorphosis in certain instances of leaves into flowers of definite shades. Why does the rose unfold a red, and the cornflower a blue blossom? Here lie two grains of wheat; one of them is still susceptible of germination, that is to say living, the other no longer so, that is to say dead: what is the physical, chemical or other differentiation between the two? Who has seen, weighed or measured the vital power or "soul" as it took its flight from the one? And so on.

Even the belauded chemical synthesis of certain organic substances, such as madder, leaves much to be desired. At the Congress of Painters at Munich in 1893 I heard several artists give expression to a wish that madder should be cultivated again, so that a good madder-colour might be procured, the artificial shade not being found durable. The latter, therefore, is not equivalent to the former, however the chemical formulæ for both may coincide.

But the most wonderful and least explicable thing about all living existences is their seminal propagation, and the persistence of specific properties; such as the ineradicable propensity of the bean to climb from right to left, and of the hop to reverse that order.

When a materialist is interrogated as to the source of organic life, in spite of the final ejection from scientific acceptance of the old theory of spontaneous generation, thanks to the scrupulous, repeated experiments of Liebig, Pasteur and Tyndall, he yet expects credence for his assumption that such a thing has once had a place on the earth, and that organisms have resulted from a fortuitous concourse of inorganic constituents. Here is a contradiction



to all scientific facts and all observations hitherto made, as Darwin admits ; in fact, a miracle strictly so-called. We have seen in the foregoing chapter that Haeckel treats the undemonstrated theory of primordial generation as *indispensable, if we are not to be driven to the tenet of a supernatural creation*. Thus the materialist can only retain his disbelief in a Deity by virtue of belief in an unproved hypothesis, or rather a hypothesis whose impossibility is scientifically established. Lord Kelvin supposes that we require no act of creation *on the earth*, because vitalized seeds might very well have fallen on our globe from other bodies in the universe. As if the problem how they arose on other bodies were thereby solved ! And why do germs of strange new organisms no longer fall on our earth from regions of space ? But we gladly resign to our opponents the task of refuting one another. It is Spiller who remarks on this point : “ Infusorial dust cannot be hurled from one world to another. Meteoric stones could not convey organic life with them, because they become red-hot in our atmosphere. Had our globe thus obtained the seeds of germination, it would only have happened piecemeal in particular spots, contrary to all known facts.”<sup>1</sup> Others notwithstanding imagine that the seeds of all life were contained in the primitive nebula in the shape of atoms of hydrogen. Tyndall, as already noticed, believes that “ emotions, intellect, will, and all their phenomena were once latent in a fiery cloud.”<sup>2</sup> Zacharias also is inclined to refer the origin of life to the bosom of the primitive nebula. It is a process that baffles conception ! Some think that these organic germs withstood unimpaired, for thousands of years, the two thousand degrees of heat of molten granite ; some, on the other hand, maintain that it was the excessive cold of cosmic space that preserved their vitality in a congealed state. But whence they came not one of them informs us.

<sup>1</sup> *Das Leben* : p. 27.

<sup>2</sup> *Fragments of Science*.

Fechner, it is true, asserts that "organisms have not proceeded from a protoplasm, but from an enormous creature of the most complex structure, which originally gave rise by a process of disintegration to a great multiplicity of the most various animals, themselves the progenitors of our present species!"<sup>1</sup> Merely a recourse to the old Scandinavian giant Ymir! What reckless speculations these are, and all to escape the confession of theism!

Moreover, the materialist can put forth only undemonstrated and indemonstrable articles of faith regarding the evolution of the higher life of thought and consciousness from that which is organic. Hartmann represents consciousness or the immanence of spirit in matter as an "obfuscation of the unconscious will in regard to the existence of objects not willed by it and yet present." He who can make "head or tail" of this stuff is heartily welcome to it! Vogt and others fancy that cogitations are a secretion of the molecules of the brain; although thought exhibits not a single property of matter, and therefore such a genesis conflicts with all the laws of chemistry. On this point Liebig remarks: "These tyros in the knowledge of natural law assert, and cause an incredulous, yet withal very credulous public to believe, that they can furnish an explanation of the origin of thought, and the nature or essence of the human mind. The intellectual man, say they, is the product of his sensations; the brain begets thoughts by an interchange of matter, and bears the same relation to them as the liver to the gall. Stripped of their borrowed finery, and the tinsel of their sophistries, all that is left of the conclusions of these gentlemen is that our legs are designed for walking and the brain for thinking with, and that we could neither walk without legs nor think without brains. But the flesh and bones are not automata; on the contrary, they are set in motion by a cause that is not flesh or bone,

<sup>1</sup> *Das Leben* : p. 49.

they are the instruments of energy. The brain is the tool of that cause which originates reflection.”<sup>1</sup>

Further than this, modern biologists and physiologists, Huxley, Bernhard, Bichat, Virchow and the rest, have not advanced with all their scientific outlays, experiments and vivisections. What life is, why and how the muscle develops force, the nerve feels, the brain thinks, and how and why similar cells develop such dissimilar activities, abide mysteries still. After noticing the works of current authorities, as well as the theory of nerve-centres and “physiological unities,” a specialist writes: “We are still quite in the dark regarding the details of the mental processes in the brain. We are conversant with specific functions of the brain associated with certain cerebral centres, such as the seat of the faculty of speech and sight; but the lines of communication are not clear to our eyes, and the methods by which the ordinary activities of the organ of thought, emotions and cogitations, are effectuated, are totally unknown to us.”<sup>2</sup>

But we have by no means come to an end of the articles of faith for which materialism would extort from its adherents a belief as blind as any with which it twits the Christian. Spiller’s “universal ether,” that supremely subtle matter, which unconsciously and involuntarily thinks in syllogisms and systems, and is strictly fatalistic and infinitely just, was marvellous enough; but a still greater giant has arrived! Avenarius of Zurich had already surmised that we should be obliged to *bespeak consciousness for the atoms themselves*. Haeckel has taken this bold step. He has found out that nothing is accomplished, neither the world nor life, con-

<sup>1</sup> *Chemische Briefe* : p. 369.

<sup>2</sup> *Naturwiss. Wochenschr.*, Nov. 1895. “What man holds of matter does not make up his personality. They are his, not he : man is not an organism ; he is an intelligence served by organs.”—Hamilton : *Metaphysics*, i. 29. (E.K.S.)

sciousness nor heredity interpreted, by inanimate matter. Accordingly, in his work *The Perigenesis of the Plastidule*, he requires us to conceive of all matter as animate, and of each atom as equipped with a fixed, eternal atomic "soul." And so we revert to the lately tabooed "soul," in other words, to spirit! "As the body of the atom," he says, "is indestructible and immutable, so the atomic soul that is inseparably joined with it, is immortal. The motion of atoms in the formation and dissolution of chemical combinations is explicable only if we allot to them *emotion and will*." He then audaciously appends the following perfectly gratuitous assumptions: "Each atom being endued with emotion and will, the plastidule (organic molecule) is discriminated from the former by the possession of memory. *All plastidules possess memory. This faculty is absent in all other molecules.* The possibility of forming ideas, of thought and consciousness, habit, nutrition and propagation depends on the function of *unconscious memory* (!) *Heredity is the memory of the plastidule, variation is its power of comprehension* (!) The one produces the fixity, the other the variety of organic forms."<sup>1</sup> Pure articles of a creed! What prodigious swarms of emotions, then, and volitions, must a pin's head contain, which, according to Gaudin, is formed of so many atoms that a man would need two hundred and fifty thousand years in order to number them; what unconscious memories must haunt a lucifer match, the millions and millions of molecules of which "unconsciously remember" all that they have experienced since they became "plastidules!"

In all seriousness we would urge that this juggling with words and theories explains absolutely nothing. Do we comprehend anything more about thought within or implicated with matter, or can we render it more plausible, by supposing that there is a thinking and recollecting soul

<sup>1</sup> pp. 39, 40, 41, 69.



in each organic molecule instead of in man? Manifestly not; we have predicated in pure caprice some billions of superfluous souls, and are not a whit the wiser. Dubois-Reymond ridicules the theory thus: "The hypothesis," he remarks, "framed by me as a *reductio ad absurdum*, that atoms have an individual consciousness, is set up by Monsieur Haeckel as a metaphysical axiom! If atoms feel, what end do the senses serve?"<sup>1</sup> Spiller, too, admitted before his death that "the attempt to explain organic phenomena by the utterly unproved and unproveable vitalization of atoms appeared to him perfectly futile."<sup>2</sup> Even his brothers-in-arms, therefore, repudiate Haeckel's fantastic speculation.

Is not a divine irony, a scorn on God's part of His scorers, apparent in the fact that men who will hear nothing of Him as an Almighty Being, filling heaven and the heaven of heavens, should be gradually driven by their own science to endow that smallest particle of matter, the atom, with inconceivable, unintelligible forces, to deify it as the primordial, eternal *causa causarum*, and grovel before this puny idol?<sup>3</sup> And these people, who expect us to

<sup>1</sup> *Die Sieben Welträtsel* : pp. 78, 9.

<sup>2</sup> *Das Leben* : p. 9.

<sup>3</sup> "No article of religion, though as demonstrable as the nature of the thing can admit, hath credibility enough for them. And yet these same cautious and quick-witted gentlemen can wink and swallow down this sottish opinion about percipient atoms, which exceeds in incredibility all the fictions of Æsop's fables. For is it not every whit as likely (or more) that cocks and bulls might discourse, and hinds and panthers hold conferences about religion as that atoms can do so? that atoms can invent arts and sciences, institute society and government, can make leagues and confederacies, can devise methods of peace and stratagems of war? And, moreover, the modesty of mythology deserves to be commended: the scenes there are laid at a distance; 'tis 'once upon a time in the days of yore and in the land of Utopia there was a dialogue

believe in this unimaginable quodlibet of theirs, are the men who are never tired of trumpeting abroad that they believe solely in what they can see and grasp and handle, what is demonstrable, what is borne out by facts, what can face the tribunal of "pure reason!" Truly, Christian faith can measure itself fearlessly with this fictitious science of materialism, in point of lucidity, logical coherence and scientific foundation! Rating hypothesis against hypothesis, belief against belief, we fancy that our faith accords best even with sound intelligence.

Materialism flounders in endless contradictions and evinces its inefficacy even in its explanation of the material creation. Dr. Klein (an adversary of Christianity, be it noted), says that "our widespread materialism is a mournful indication of the too commonly obvious defect of logical training among men of science. Disciplined intellects cannot but take umbrage at the obscure idea of "force," and the occult coalition of this force with matter, and be particularly offended by the utterly preposterous derivation of psychical life from matter. These phenomena nevertheless masquerade gaily (e.g. in Büchner), now in the

between an oak and a cedar': whereas the atheist is so impudently silly as to bring the farce of his atoms upon the theatre of the present age; to make dull senseless matter transact all public and private affairs by sea and by land, in Houses of Parliament and closets of princes!"—Dr. Bentley : *Boyle Lectures*, p. 66.

"It is justly presumed that none will ascribe to matter, as such, the powers of ratiocination or volition; for then every particle must needs be intelligent. But if the particles of matter, moved to the utmost subtilty and highest vigour, shall then become rational, how is it that we observe not, as it is more swiftly moved, a discernibly nearer approach to the faculty of reasoning, and that nothing more of an aptitude towards wisdom is to be perceived in an aspiring flame or a brisk wind than in a clod or a stone?—John Howe : *Vanity of Man as Mortal*. (E.K.S.)

guise of corporeal motions, now as their results. Nor can we omit the sheer disregard of the principal difference between corporeal and mental acts, as exemplified in the well-known dictum of Vogt that thoughts separate themselves from the brain just as 'urine from the kidneys' . . . The objection first mentioned applies especially to that mongrel materialism which is gaining currency under the name of 'monism.' For the universal matter postulated by this school is a completely futile metaphysical notion, because it out-distances all experience. It is a pure invention, and indeed, judged by its assumed properties, a self-contradictory, confused, irrational invention, predicated as an absolute, indeterminate abstraction! In short, in my opinion materialism in every shape is a purely dogmatic, metaphysical system."<sup>1</sup>

## II.—IT CANNOT EXPLAIN MORAL PHENOMENA

The materialist is little able to explain the forms or appearances of matter; but the inadequacy of his philosophy is yet more patent when we confront it with natural and human life, the outlines of history, its ruling ideas and spiritual agencies. For he does not attempt at all to explain spirit; he simply rejects it. How can this eternal matter have 'happened' to create spirit, its spectator, critic and censor, which peremptorily proclaims its dominion over matter? And not unjustly, for we are superior to that which we explore and explain.

Love, faith, hope, duty, the moral sense, prickings of conscience, the fear of God and religious emotions are to him whimsical, meaningless, inscrutable modifications of substance; for in their constant aspiration upwards and Godwards they exhibit a sort of derangement, and stubbornly disclaim inert matter, their source and parent. Gladly

<sup>1</sup> *Natur*, 1894.

would he regard them, as a Frenchman has already done, in the light of chemical products, which advanced humanity will one day compound and decompose by artificial processes ; for they are an uncommon vexation to a class of mind which knows no better than to characterize the religions of all nations for ages past from the south to the north pole as mere "cunning devices of a dehumanizing priestcraft" ;—most poverty-stricken terms judged by the light of history and common sense ! For six thousand years man has bowed down before two powers, of good and evil, of whose shadowy empire in nature and himself he is alike conscious, whether he be Indian or Esquimo, Hottentot or Tungusian. Whence this common feeling among all nationalities of a separation from a great, unknown Being, of an exile from a blissful spot never beheld, yet ever guessed at ? Who dares to assert, Seneca could cry, that the gods live without concerning themselves with us ? Does he not "hear all the voices of prayer, sees he not all the hands that are lifted up toward heaven over the entire globe ?" <sup>1</sup> "The heart of man," says Jacob Boehme, "is ever in quest of the fatherland whence it has strayed away, and covets evermore a perpetual resting-place. It is always demanding where God and the holy angels dwell, where the fair homeland is whither death enters not in : it cannot be in this world ; else would it have been lit on long ago."

Impotent to explain the origin of life, materialism can

"Hoc qui dicit (i.e. Deum securum et negligentem nostri nihil agere), non exaudit precantium voces et undique sublatis in caelum manibus vota facientium privata ac publica. Nec in hunc furorem omnes mortales consensissent adloquendi surda numina, nisi nossemus illorum beneficia nunc oblata ultro, nuncorantibus data. Neque enim necessitatibus tantummodo nostris provisum est : usque in delicias amamur."—*Sen. De Ben.* iv. 4. Cf. *Cic. De Nat. Deorum*, i. 44. (E.K.S.)



cast, of course, no light on the presence of death, which it places among material, but we among spiritual phenomena. For that "grim Feature," whose pinions overshadow and enshroud the world, is not a natural apparition, or any riddle to be read by science at her ease, but an abnormal, super-induced, strange contradiction, an "intruder" from without! This is proved by the agony of the whole creation at its approach, by the mortal anguish of the animal and the *infusorium*, and man's ineradicable dread of dying. If death be nothing but the natural resolution of the body into its atoms, what difference can it make to them, whether they enter into new combinations or not, whatever these may be? Would chemical elements be thus agitated at a resolution into other elements? Nay, if, to use a favourite expression, death be the end assigned by "unerring nature" to life, it should much rather be uniformly accompanied with that emotion of satisfaction awakened by the attainment of other ends. Yet such is not the case, and even death by senile decay, which we term, like everything that is of daily occurrence, "natural," is anything but that. It enters into no child's head to inquire why so-and-so is alive; but it never fails to ask, 'Why did he die?' And so Yung writes, in reference to the aborigines of the Lower Murray in Australia: "The Marrinjeri regard death as something unnatural. They suppose that the life of man would continue unimpaired, if accidents or sicknesses occasioned by the power of wizards did not terminate it." The Parisian faculty of medicine itself debated in 1572 the thesis, whether the necessity of death were innate in man? Schwann, the founder of the cellular theory, declares candidly that he really does not understand why people die.

The common comparison of the aged human frame with a worn-out machine is itself mistaken. The body is not a lifeless machine, driven by an extrinsical force, such as steam or water, but, like the egg or acorn, an organism

possessing in itself the powers which build it up afresh. It is quite inexplicable why the child, after it has grown in stature by assimilating nourishment, should all at once cease to grow, whilst the adult still eats and digests as before. It is yet more unaccountable why towards the close of life the body shrivels, becoming actually reduced in bulk, and dies ; why, that is, the vital powers become crippled ; for elsewhere in nature we know no instance of crippled energy. To talk of bones and sinews growing hard and brittle sheds no light on the matter, because the bones and sinews of an old man are not at all the bones and sinews that he possessed in youth. As is well known, the human body renews itself not only once in seven years, but still more quickly, as we may convince ourselves by observing the growth of hair and nails, and the rapid cicatrization of wounds. It is replaced each third year on an average ; for in the case of different persons, and even different portions of the same physical frame, this redintegration occurs either more swiftly or slowly, as the case may be. Accordingly, the veteran of seventy has no longer the body that he had in his sixtieth year. Why cannot the like vital energy continue to produce out of like substances, often under the much more favourable conditions of affluence, superior food and increased rest and self-tendance, the same body as in earlier days ? And why does it finally refuse altogether, in spite of an adequate amount of eating and drinking, to construct a body any longer ? Man has to die at last, ostensibly of age and weakness ; as if force, or matter such as phosphates or carbohydrates, could grow old ! Were the particular sections of a locomotive carefully renovated from time to time, as soon as they betrayed traces of wear, no one would anticipate that this engine would by degrees grow less serviceable and at length come to a stand, and this *because the motive-power was exhausted !*

The steady life, the regular growth of an organism, which at the outset possesses the forces requisite for growth, is the sole "natural" event, where sufficient material supplies are available. This is the language of the Bible. The living God created all His creatures for eternal life : but "by one man's sin, death, the wages of sin, came into the world." Yet in concord with the aspiration of the spirit within us, which feels that we are formed for life and not death, it gives us the promise that "there shall be no more death." As to the reason why man dies through "decrepitude," it tells us that Abraham died 'full of days,' or life.<sup>1</sup> "Forasmuch," says Jacob Boehme, "as the soul which God has sent into the world, having beheld the mystery of creation to its depths, and descried that it is but a mirror of the eternal, shatters the mirror and pines after eternity again, whence it came forth ;—therefore we die." Or, in Culman's words, "after the reception of the gift, it proceeds of necessity to the reception of the Giver." This world is at once a gift of God and a work of the devil. When a man has tasted to the full its joys and sorrows, ideas and powers, he finds it insipid, and longs for a higher potency either of holiness or evil ; and expires, not because his bones are grown hard and brittle, but because the spirit within him will not take the pains any longer to maintain a corpuscular framework, because his soul is unwittingly sated with terrestrial food. So much from the subjective, human point of view. Looked at from the divine side, we die because we estrange ourselves from the Fountain of Life by accumulated transgression, as a bough imperceptibly dismembered from the trunk which conveys to it the vital sap.<sup>2</sup>

\*<sup>1</sup> The precise expression שָׂבַע יָמִים is used of Isaac (Gen. xxxv. 29) ; but the adjective is used of Abraham (xxv. 8). (E.K.S.)

\*<sup>2</sup> Yet the *season* of death (e.g. that of infants) must be referred to an act of divine Sovereignty. (E.K.S.)

The death of Christ on the cross and the suicide of Judas furnish a type of the normal death both of the Christian and of the godless. The fitting close of a Christian's course is a martyrdom, the surrender of the life lent him by God for His sake, from love to Him who Himself suffered here below a martyr's death. The proper termination of an atheist's career is self-murder, a voluntary plunge into the seductive vortex of fancied annihilation ; in reality a leap into the iron grasp of Satan. The materialistic philosopher Von Hartmann has, with noticeable candour, fixed on suicide as the ultimate consequence of materialism. The speediest self-immolation of humanity and the creation *in toto*, the universal suspension of a "desire to live," is his *summum bonum*.<sup>1</sup> From his standpoint the man is perfectly right, and no less an authority than the apostle Paul is his voucher. For whilst he exclaimed on one occasion "O wretched man that I am ! who shall deliver me from the body of this death ?" on another he avows openly, "if in this life only we have hope, we are of all men most miserable."<sup>2</sup>

It seems indeed as if comparatively few had met with either the one or the other fate. But when a man deliberately lavishes his whole life and spends himself in God's service, is not his a martyr's death ? And is it not an act of suicide when another squanders his vital energies in the service of sin, by forbidden pleasures, "lust of the flesh, lust of the eyes, and pride of life," and thus curtails his

<sup>1</sup> A recurrence to Pliny's pessimism : 'Mortem sibi consciscere ; quod homini Deus dedit optimum' (*Nat. Hist.* ii. 7). Cf. Cowper :—

"All his hopes  
Tend downward : his ambition is to sink,  
To reach a depth profounder still, and still  
Profounder, in the fathomless abyss  
Of folly plunging in pursuit of death."—*The Task*. (E.K.S.)

<sup>2</sup> Rom. vii. 24 ; 1 Cor. xv. 19.



allotted span ? Are not most, nay all men, rightly viewed, either martyrs or suicides or both ? The ever increasing number of the latter, exceeding in Europe alone 500,000 yearly, evinces how fearfully true is the assertion, that self-destruction is the habitual end of the wicked ; and God only knows how many instances are hidden out of sight ! In any case, it is an accredited fact that during the last century they have far outnumbered all the soldiers slain in the Napoleonic and every later war ; suicides of the highest and foremost in rank of the most learned and esteemed, of the richest and, to outward appearance, most fortunate ! We can hardly take up a newspaper without encountering "sensational suicides," not merely of desperadoes, hopeless fathers, victims of seduction, and youths bent on notoriety, but also of peers and generals, officers and bank-directors, students and public officials. We challenge the enemies of Christianity to produce an equally lengthy catalogue, or a list a tenth or a hundredth part so long, of "fanatics" or "saints" who have made an end of themselves during the same period. And if they plead in excuse that in most cases constitutional weakness or derangement has had a share in the matter, which we do not totally deny, still we take occasion to emphasize the singular circumstance that Christians remain strikingly exempt from these lamentable aberrations of mind.

For materialism can account for the "second death," that of the soul, far less than for bodily mortality. The terrible ends of many hardened criminals and blasphemers (even where there is no exceptional bodily suffering), who smarting under the lash of remorse and aghast at the future have declared that they were already in hell and felt its tortures, this "fearful looking for a future judgment," is an undeniable reality, not to be unriddled by any theory of eternal matter. The deaths of Nero, of Voltaire and Domitian furnish examples. The latter is pictured

as quivering with fear in his boat whenever the oars dipped into the water, so that the rowers were obliged to desist, and the skiff had to be towed along, whilst the emperor sat "pale and mute, like a victim on his way to execution." The *conquistador* Alvarado, who let his dog devour the vanquished Indians alive, and then, himself fatally wounded, scowlingly checked the inquiry of his comrades as to the seat of his pain with the words, "It is in my soul!" is a sufficient refutation of that philosophy. And not less so the beautiful, unruffled, tranquil *euthanasia* of the Christian. He expires—and we have in our eye not so much the act itself as the frequently lingering evanescence of life from the moment at which the patient is aware that his end is come—at peace with his fellow-men and himself, reconciled to God and the world, softly as the ripe fruit falls, whilst there often beams in his countenance the reflection of an unearthly lustre, and echoes in his tones a sincerity which is not of this world. That also must have its solid foundation.

But if materialism cannot shed light on the origin of life and the occurrence of death, neither can it account for the simplest and most accessible phenomena of this life. For instance, how can such trifling quantitative and qualitative physical and chemical variations, as occur between the brains of eminent and insignificant men, account for the enormous contrast in their respective achievements? A Peter the Great, who by the tremendous energy of his bare resolve welded an empire out of barbaric, discordant elements, or a Napoleon who recast the map of Europe, considered historically, are infinitely more important figures than a whole host of brewers', butchers', or farmers' men possessing the very same amount of cerebral tissue.<sup>1</sup> Wherein does the cause of this distinction lie? If pro-

<sup>1</sup> "It appears from Bischof's tables that even the Bushmen often have as large brains as an educated European. And, as regards quantitative relations, it is a notable fact that the

portions are to decide, there ought to be a distinction of hundredweights; and qualitatively the finest conformation of cells imaginable is totally incompetent to furnish a solution. Looking at the matter from another point of view; let us suppose that some puffy old bachelor dies in a provincial town. Not only the world in general, but the place itself, his immediate neighbourhood, suffers no derangement; that event makes no gap in its circles. But Alexander the Great expires, and the world threatens to be thrown off its hinges. Yet, to materialism, precisely the same thing has taken place, the disintegration of forty-six ounces of cerebral tissue and of one hundred and eighty pounds of flesh and bone, which now enters into inorganic instead of organic combinations. Wherefore then this universal commotion in the case of Alexander, if that is the sum and substance of the matter?

Moreover, if existence, as a well-known materialist declares to be the verdict of his philosophy, is the greatest of all ills, he should have the courage of his opinions, and extol Khingis Khan, who erected pyramids of seventy thousand human heads; Torquemada who made it his boast that he had burnt eight thousand men; or better still that Chinese general who beheaded one thousand prisoners daily for three months during the Tai-ping rebellion, as truer benefactors of humanity than Saint Elizabeth or Miss Nightingale, Mary Reed or Kate Marsden, the devoted nurse of the Siberian lepers, who have preserved thousands of sufferers longer in an unprofitable state of

elephant has on an average  $3\frac{1}{2}$  times and the whale nearly twice as much brain as man. But if it be contended that the weight of the animal determines the matter, it is rather perplexing to find that by this standard the elephant has no more cerebral tissue than the salamander or tortoise, and, on the other hand, sixteen times the amount of the tunny-fish; and man himself less than a singing-bird!"

Bettex: *Das Lied der Schöpfung*, p. 284.

existence by their philanthropy and well-devised therapeutics ! Then the mother who for years nurses a poor crippled, perhaps half-crazy child at the sacrifice of her own health, is positively acting criminally ; for she is prolonging a painful life to no purpose, and at the same time exhausting by this nursing her entire available strength ! Such a philosophy is confronted by a world fraught with more enigmas than the profoundest Christian mystic ever conjured up.

The relation also of the materialist to nature is antipathetic. It is divested of all cordiality and sympathy. Inevitably so ; for his " nature " is nothing save the product of blind forces, often very capricious, often irksome and destructive in their action. This altarless shrine, this palace reft of its sovereign, is a chilling vacuum, How can he feel himself attracted to shifting phases of matter ? In fact, the human soul is so constituted that it cannot make much of an impassive object. He has little attachment even to wife or child, exactly in accordance with his philosophy. We do not wish to insinuate that he cannot form a tolerable father and husband ; for man is never so good or so evil as his theories ; but when one celebrated materialist describes woman as the " maternal animal of the race," <sup>1</sup> and another expresses astonishment that any mother can be almost distracted with joy because " a few pounds of flesh have begun to squeal," it betrays no extraordinary appreciation of the intrinsically feminine <sup>2</sup> temperament, nor of the strangely winsome ways of a little child.

| Nor does he evince any desire to glorify or enhance nature ; but it is interesting, and yet mournful, to notice how by his disruption from God he grows sensibly estranged from His creation, and makes at first uncon-

<sup>1</sup> Germ. Das Muttertier.

<sup>2</sup> Germ. Das Ewig-weibliche, a phrase of Goethe.



scious, and at length deliberate, attempts to replace it by artificial and studied refinements. A few years back the manufacture of means of nourishment was fixed on as an ideal to be aimed at in a congress of scientific men, and the hope expressed that gradually, in the course of centuries, mankind would become accustomed to a sixth finger—ideals, by the way, too paltry even for a Kaffir or Red Indian ! For it is not half a dozen fingers or so many tons of chemical aliment that the savage craves, but that he may be freed from the gnawing disquietude of his burden of guilt, and the crushing sense of his fugitive mortality. Professor Berthelot of Paris has recently affirmed publicly how happy mankind would be if, permanently getting rid of the toilsome tasks of agriculture and horticulture, instead of feeding on meat, vegetables and fruit, they needed only to carry a small pill-box about charged with albuminous phosphates and other means of nutrition cheaply produced by dint of electricity ! It cannot be clearly gathered from his address whether he meant this quite seriously ; but in any case he is the mouthpiece of an avowed aim of many materialistic chemists and students, especially in America. Thus the gifts of a beneficent God, which He purveys for us all the world over in the form of millions of hundredweights of corn, oil and wine, palatable vegetables and precious fruits of the earth, growing day and night, that we have but to gather from orchards which, once planted, regale us with their produce for fifty or a hundred years, and grass for the cattle which feed themselves and by whose milk and flesh we are fed,—all these we are to fling down at His feet : and in place of them, at immense labour and cost, to erect countless electro-chemical factories on all sides, with thousands of expensive machines, constantly needing repair, and therefore involving enormous workshops as well. And thousands of labourers transformed into artizans are to

manufacture night and day in these food-factories millions of hundredweights of food, and to solder up hundreds of millions of boxes to contain them, to meet the hourly demands of the human family, in the midst of noise and uproar, besides all manner of risks and charges, surrounded probably by mountains of offensive refuse, and ponds of malodorous liquid! Other thousands meanwhile must be employed incessantly in packing, addressing and dispatching these boxes, to secure their uniform distribution, and in the receipt of payments for them. Should any hitch take place in the machinery or means of transport, starvation, to be sure, is the immediate sequel. Would these pills (coloured, no doubt, a tasteful sky-blue or red) suit every stomach, and not disagree seriously with many constitutions after a few weeks or months? And all this pains in order that future generations, dismissed from the healthiest of all labour, tillage of the soil, may roam idly and wearily, capsules in hand,—except indeed some millions of unhappy workmen,—through a land beset with thorns and thistles, or, as Professor Berthelot prefers, through desert wastes, whose air is “so much more salubrious than that of forests and meadows!” No more festive circles or hospitalities, no more common bonds knit by recurring family meals! Everybody is to make a dive once an hour into his penny pill-box, and . . . cannot discover anything else in the world to do! For, unquestionably, so soon as the spur of necessity, the mother of invention, is removed, man will perform no work mental or physical, but stagnate and degenerate visibly. The example of the Fiji islanders and Tahitians, and of the Romans, when once they had secured “*panem et circenses*” at the cost of the State, may convince us of that. “Wherever,” says Wallace, “as in New Guinea, eighteen hundred cakes of half-a-pound each can be procured by ten days’ labour from one sago tree, and the annual

cost of living amounts to less than twelve shillings per head, man lives in physical wretchedness; for the less work nature exacts from him, the more he loathes it." An unemployed humanity would be the most frightful and very soon the most disgusting spectacle conceivable; for its vices would flourish like weeds where cultivation is completely checked. There is a certain Egyptian tomb whereon appears a harvest-scene with this superscription: "Whilst man tills the earth, he abides tender-hearted." Such is ancient wisdom; and such modern folly!

These vulgar aspirations and materialistic forecasts of the future cast a baleful light on its entire philosophy: for a man is known by his ideals. Interrogate him as to his supreme wish, or what he would do if he inherited half-a-million to-morrow, and his reply will disclose his character. Once upon a time there stood in the desert of Sinai an aged man, to whom Jehovah had pledged His favour. What was the boon he asked? How natural to have besought the kingdoms of the world—for he set little store by gold and silver—or strength to exterminate every enemy; or a thousand years of life, that he might witness in enviable security the rise and downfall of empires. Nay, this was all his petition: "O Lord, show me Thy glory!"

The materialist's comprehension of the creation is so slight that he complains that the evidences of design so often admired in nature are nowhere to be met with. But the proof that this world has been methodically planned is that it continues to exist; otherwise it must have fallen to pieces in the first hour of its birth. The change of one particular imperils all existence. A trifle more carbonic acid gas in the air, or the substitution generally of salt-water for fresh, or the difference of one hundred degrees in temperature, and we perish; and the

half or whole of the earth is at once rendered lifeless.<sup>1</sup> Remove a single letter from a chemical formula, a single numeral from the infinite series, and the equation of the universe would tally no longer. Were this world not contrived according to a predeterminate plan, the air would no longer be adapted for breathing, nor the lungs for air; plants could not be eaten by animals, nor would animals have mouths with which to eat. To deny the purpose of creation is to deny that the fish is designed for water, and the bird for air, the eye for light, the ear for sound, hands for grasping and feet for locomotion.

Of the final aim of creation Schopenhauer says: "In the present day, morally feeble as it is, Pantheists do not blush to allege that life is its own end. If this existence were the ultimate goal of the world, it would be the most senseless ever contrived, whether it were ourselves or any other who fixed it." Similarly, Flammarion declared at the graveside of his friend Marpon that "if that tomb were the ultimatum and last word of existence, the creation was reasonless, and all the suns and moons of infinite space, all its life, lustre and hope had less meaning than the pettiest action of the dog or the ant. That would exhibit an aim; nature in general none." But design presupposes a conscious will, and the proposition is still valid that one may believe the spontaneous genesis of this world of co-ordination when the four-and-twenty letters of the alphabet, after being mixed in some thousands

<sup>1</sup> The extreme accuracy of this adjustment has been freshly illustrated by recent experiments made to discover the effect of increasing the supply of CO<sup>2</sup> round growing plants. Small as is the proportion of this gas in the air (three parts in 10,000), it is found that if it is increased to about thrice this amount nearly all our flowering plants would perish through failure to blossom, and consequent lack of reproduction. Such a modification would, in fact, altogether change the temperature of our atmosphere. (E.K.S.)



of instances and duly shuffled, spontaneously arrange themselves into an Iliad or Odyssey; and not till then.<sup>1</sup>

The rejection by the materialist of the moral design of the universe is still more untenable than that of its material end. Repudiating all human experience, facts daily ascertainable, the inward voice of the soul, the fundamental principles of all governments, and the wisdom and aphorisms of all nations, he disputes the actual utility and reimbursement attendant on virtue and justice, and the injury and ruinousness or inutility of vice and injustice. He cannot explain, and his system forbids him to allow, that "ill-gotten gains never prosper," that "honesty is the best policy," that "lightly won is lightly spent," that "pride goes before a fall," and that all guilt on earth brings retribution;<sup>2</sup> in short, that "righteousness exalteth a nation, but sin is the perdition of men."<sup>3</sup> For that great fact, eternally confirmed and certified by the events of history, both individual and national, that divine impress stamped on the world which Job and his friends alike confessed, and which Solomon affirms in his proverbs, is no chemical or physical law, but a phenomenon irreducible to any mere atomic mechanics. Herein lies its permanent weakness and inadequacy, and would still lie, even if he contrived to interpret all phases of matter, and to decipher all its enigmas.

This moral blindness engenders the midnight darkness which wraps him round. Solomon's utterance, "The

<sup>1</sup> "Qui existimat mundum effici potuisse ornatissimum corporum concursione fortuita,—non intelligo cur non idem putet, si innumerabiles unius et viginti formae litterarum aliquo coiciantur, posse ex iis in terram excussis annales Ennii effici."—Cic. *De Nat. De*, ii. 37. (E.K.S.)

<sup>2</sup> Germ. Alle Schuld rächt sich auf Erden: a verse from Goethe's *Wilhelm Meister*. (E.K.S.)

<sup>3</sup> Prov. xiv. 34.

righteous shall eat to the satisfying of his soul ; but the belly of the wicked shall want,"<sup>1</sup> is thus fulfilled. Whilst the Christian in all places and conditions sits, as it were, at a banqueting-table, and is satisfied with the order, righteousness, goodness and wisdom of God's universe, to the growth and increase of the inner man, this world is desolate, parched, sterile and displacent to the famished materialist ; an unregulated, objectless, bewildering machine. Of what use is it to do justly, what is the worth of life, if right is tantamount to wrong ? And so the nobler his original disposition, the sourer and more pessimistic he becomes, as is not seldom visible in his words and writings. Many there are who, had they the same candour, would deplore with the great German classic, "an inward saplessness." With that loftier logic of intuition, which guided the Greek when he cried to his opponent that he was in a passion, and therefore in the wrong, we tell the materialist that his philosophy makes him miserable, and consequently is false. Its sole endurable specimen is that of the stolid Epicurean who, never asking what is truth, spends his life suitably to the motto, "Let us eat and drink, for to-morrow we die," long ago recommended to his notice by Paul.

No light is thrown by such a system on science or art. To its consistent adherent knowledge and its contrary are matters of indifference. There can be no reasonable pursuit in such a transient career, emerging from nothing, reverting to nothing, except to secure the utmost bonus of enjoyment possible with the least possible infusion of pain. If any man's pleasure consists in science, there is nothing to be said against his seeking his personal gratification in that quarter ; but it is illogical on his part to demand of me that I should find my pleasure therein as well, or indeed should concede to science the least claim

<sup>1</sup> Prov. xiii. 25.

or influence over my life. I am at any moment warranted in retorting that I prefer gratifications purely material, or sheer idleness. In fact, the materialist has no solution to offer of that inextinguishable thirst for knowledge which is manifested even in the child's questions, "What is that? What is that called?" Far less can he throw light on art. It is of the same value in his eyes as the Fiji women's self-adornment of shells and corals, or the Indian's war-paint and tattooing: an unaccountable, unconscious impulse of matter to deck itself out with other matter, just because it so fancies. It is singular, nevertheless, that mankind treasures art so highly. How comes it that people to whom it is such a wrench to part with their mammon will expend thousands of pounds on a piece of painted canvas, and thousands of shillings on a few trills, vanished almost as soon as heard, of Lucca or Adelina Patti? Meissonier's sketch of a grenadier is worth £120; a much more exact photograph, well taken, of the same subject, bears a value of one-and-sixpence. Why?

But we may summon all the gifted artists of all time who have felt her charm and pursued art with feverish zest and ardour and touching whole-heartedness, postponing honour and success, wealth and property, even daily bread, to her claims, as witnesses that art is a very much nobler matter! A painter is not a man who has learnt to prime with chalk and pipe-clay, to lay on burnt sienna and vermilion "for warmth" and shades of cobalt and Schweinfurt green "for coolness," and to put in mellow<sup>1</sup> tints as a finishing touch. A musician is not a man who, after years of practice, has acquired the skill of executing silvery runs and of surmounting without effort the greatest technical difficulties; nor is a poet a being who, in sheer disregard of clean linen and the usages of the toilet, boasts a leonine mane, and writes or recites the most

<sup>1</sup> *Pastose*. I take this term to be Italian. (E.K.S.)

eccentric thoughts, grouped with prodigious skill in rhymed couplets. On the contrary, whether chiselling marble or modelling terra-cotta, or painting in oils, distemper or water-colours, whether building temples or cities, singing or playing the flute or organ, the artist is everywhere a man to whom matter, valueless *per se*, is merely a medium for the free expression of the enduring ideas of beauty which haunt him: he is the man who perceives spirit through matter, significance beneath form, the physiognomy of the mind in the colour, in all temporary phenomena the symbolism of that which is permanent, and is not at ease till he has made visible to others the truth and beauty of these imperishable divine ideas. And humanity is grateful to him, and draws solace for centuries from his art; for that its intellectual life stood in need of these ideas it is by no means unconscious.

Upon turning to the highest form of art, that of poetry, we find it based entirely on anti-materialistic views, and only possible at all in these conditions. From Homer downwards the immutable ideas of the divinities, or of guiding, illuminating and avenging powers, of the strife between the dual principles of good and evil, of the ultimate prevalence of righteousness and virtue, and of the immortality of the soul, have been the theme of poesy; without these there can exist no drama, but only a puppet-show; for, as even poor Lenau<sup>1</sup> says, "There are eternal principles! All tragedy depends on the truth that there are things from which we cannot release ourselves." But these ideas point to a common and supreme source of the beautiful such as is suggested by the interrelation of all the arts. Thus the *Nibelungenlied* can be

<sup>1</sup> Lenau was the *nom de plume* of an Hungarian poet of the first half of the 19th century, whose works, though very pessimistic in tone, are still esteemed in Germany. He became insane before his death. (E.K.S.)



translated into music, pourtrayed by sculpture, and so on. Art is a perpetual protest against materialism, which has therefore never produced men at once masters in art and intellect, men like Michael Angelo, Dante and Bach ; nor will it ever in the future !

But the real weakness of materialism has not even yet been probed. That philosophy, falsely so-called, ignores the three mightiest powers of human history—love, faith and hope : those imponderable energies which influence the soul far more than the forces of gravitation, heat or electricity affect the body, and without which the life of man is but a bestial lust of eating and drinking, but a self-laceration in the struggle for animal pleasure or worldly gain.

Love is eliminated from the world by the materialist. He knows no use to make of it ; at best it is to him a subtle, magnetic attraction subsisting between heterogeneous particles of matter, a chemical elective affinity ! Yet a world bereft of love would be a den of murderers. As well imagine ourselves sequestered from daylight. What is it that drives millions of individuals to work toilsomely and ungrudgingly from morning till eve at the plough or the vice, mine or quarry, with the aim of procuring food for their wife and children at home ? It would have been easier far to lead a single, unsociable life. Whence comes it that millions of mothers expend their strength night and day and forgo their comfort for long months and years in nursing, tending and sheltering tiny creatures who are quite helpless and unable to requite this trouble, nay even in surrounding sickly, crippled children, from whom no return or service can be anticipated, with tenfold affection ? How comes it that these millions of children, without vouchsafing them a word, much less making themselves useful, render their parents supremely happy by a merry laugh, by a smile of love

and gratitude, or a caress, and with this fragment of affection recompense them a hundredfold for all that they have done, and irradiate and cheer a home of which they form the centre with the sunlight of love? Is this only a chemical, material product? What is to explain the fact that thousands of noble men and tens of thousands of unselfish women watch calmly and indefatigably by numberless sick-beds, nursing the wounded and dying on fields of battle, binding up their wounds and wiping from their brows the damp of death? And how does it happen that such, not merely aimless, but preposterous prodigality of life and strength, as it appears from the materialistic standpoint, invariably touches our hearts, and wakens the esteem even of men of the rudest stamp? Or how comes it that every year, like the flowers and blossoms of spring, thousands of fair brides vow love and fidelity at the altar with all their hearts to the man of their choice, and pledge themselves unreservedly to count it their happiness henceforward to minister to his? What wonders has not love wrought since there have been men and women on the earth, in founding and overthrowing cities and kingdoms too, in levying wars and concluding truces?<sup>1</sup> The materialist has nothing to reply to all this; he can only resort to supercilious smiles and feeble subterfuges. To be sure! for his idol, "primordial matter," is insensible to love; such an infirmity cannot be imputed to atoms of iron or hydrogen! But then he ought either not to insist on presenting us with a philosophy of the universe at all, or to confess that moral levers—forces of a higher nature than material—move the world.

<sup>1</sup> "All thoughts, all passions, all delights,  
 Whatever stirs this mortal frame,  
 All are but ministers of love,  
 And feed his sacred flame."

—Coleridge. (E.K.S.)

The second of these motive-powers is faith. We have already seen how both it and unbelief have ever been and ever will be influential in swaying the world. But we will consider the question from a materialistic point of view. A well-known scientist remarks sarcastically of this power of faith that it may remove mountains, but has never yet been found of any service in mechanics. Indeed! Let him open his eyes to history, and he will find that it has removed other things beside mountains. Was it not a singular mechanical force which, in the times of the Crusades, transported thousands of galleys laden with heavy weapons of war and ponderous stores, tens of thousands of mail-clad cavaliers and their horses, together with hundreds of thousands of foot-soldiers and their baggage, from Europe to Asia? Here at any rate is a supply of energy to be reckoned by millions of hundred-weights; and what else was it than the belief that such was *the will of God*? It was His will; for they landed and conquered Jerusalem, and new ideas were wafted from east to west, and millions of men were diverted from their savage life, ambitious only of combat and sensual pleasure, to the higher ideals expressed in the Crusading hymns. What was it that urged three caravels with their crews and freightage across the unfurrowed Atlantic waves to an unknown goal in 1492? What else but the faith of the man who watched through tedious days in the fore-castle, to descry whether the land in which, despite the learning of his day, he believed, was yet emerging from the waves? Has not this faith of his occasioned all the ensuing effects, voyages and eventualities interwoven with that discovery, and thus shaped and actualized a new world? So it was confidence in their "stars," their destiny, their divine "mission," or their own strength, that enabled Alexander and Caesar, Attila and Buona-parte to raze or to found empires, to change the surface

of the globe, and looking at the matter with a materialist's eyes, caused them to effect mechanical achievements and transpositions such as all the steam engines of modern times have never brought about.

And what a profusion of material, political, historical, moral and spiritual issues has the Reformation displayed ! What broke the dominion of the Papacy, and drove into collision the armies of Sweden, Germany and Austria in a Thirty Years' War ? Was it not, next to the will of God, the faith of *one* man who cried aloud in Worms, " Here stand I, I can do none other ; God help me ! " Had Luther faltered in his belief, had he craven-heartedly concealed himself that day, and then fallen under the ban of the Empire, the world's history would have pursued another track.

This same faith then, which the unbeliever who has it not represents as an unreal, ineffective enthusiasm, has proved itself repeatedly in human history to be an all-prevalent, and indeed " mechanical," factor. This can only be disputed by those who have not been schooled by consecutive thinking to acknowledge imponderable, spiritual agencies as the true springs even of the material activities of men. Is it not the decisive testimony of language everywhere that a *power* of volition exists ? For it justly recognizes that here we have a real force independent of the size or weight of the body or of the absorption of oxygen by the lungs, and yet competent to produce exertions of nerve and muscle of indisputable significance.

Yet, for that matter, the materialist makes surreptitious use of faith, as we have already noted, to the most lavish extent. He *believes* all kinds of incredibilities (more or less), and demands of others that they should believe them too. Such tenets as these : (1) " That which is immaterial can in no manner whatsoever react on that which is material " (Spiller) ; (2) " Thought is a



motion of matter" (Moleschott); or (3) "The soul is merely the brain in process of action" (Broussais): are articles of belief, for no one can prove them, and are believed by those very persons whose entire philosophical bias induces them to do so.<sup>1</sup>

On the other hand, he knows nothing of hope, a word omitted from his vocabulary. Never has any philosophical system or theology so precisely answered to that tremendous line of Dante:

'Lasciate ogni speranza voi ch'entrate!' <sup>2</sup>

as Paul knew well when he bid the Ephesian converts remember that they were once "hopeless atheists!" <sup>3</sup> However well-to-do and respected, however scientifically eminent and satisfied with my position I may be, to-morrow or to-day some banker may abscond with my entire property, or worse still, my wife may die of syncope, or my child of diphtheria, or my family doctor disclose to me with a grave look the news that I am suffering from laryngeal phthisis or hydrocardia, and that he can do nothing for me! My whole future is then overshadowed; nothing but trouble, pain and misery, with death to close the scene, awaiting me. Then no fine phrases about "scientific achievements" and "the admiration of posterity" will afford me relief. All is "blackness of darkness" to the soul.

Some years ago I was visiting an owner of property with whom I had some intimacy, and happened to speak casually to him of Paradise. He smiled at my remark, and pointing out of the window towards his extensive estate,

<sup>1</sup> "The human understanding admits a tincture of the will and the passions, which generate their own system. For man always believes more readily what he prefers."—Bacon: *Nov. Org.* i. 49. (E.K.S.)

<sup>2</sup> *Inf.* iii. 9.

<sup>3</sup> *Eph.* ii. 12.

said, "There is my Paradise!" Certainly the prospect was charming. There were vineyards and meadows, fringed with blooming orchard-trees, stretching away in the sunlight, and sloping by a gentle declivity right down to the margin of a blue lake. On the farther shore a chain of beautiful hills rose into view, and higher still towered in the far-off azure the snow-clad summits of the Alps. A glorious picture! A few years later I came thither again. The lake was dancing in the sunshine as smilingly as ever and the trees wore the same emerald hue, but the proprietor was sitting in his room a broken-hearted man, brooding dismally in an armchair. His favourite son had been drowned before his eyes in that lake, one daughter had married unhappily, and he was himself slowly wasting by an incurable disease. When his younger daughter came into the room, saying, "I am going to drive into the town, father; is there anything I can fetch you?" the old man answered savagely, "Yes, a revolver!"

And yet those who are thus putting out the sun of love in the sky and the morning and evening stars of faith and hope, who foretell to mankind nothing but the pitchy night of annihilation, dub themselves "*illuminati*," and denominate us who believe in a God who diffuses light and love, and expect an immortality where we too shall "shine as the sun,"—they nickname us "obscurantist" fanatics!

But they are themselves aware why it is they treat love so cavalierly; for love suggests and presupposes goodness, is its progeny and nursling, just as hatred preassumes its parent evil; and we proceed by a legitimate induction from love to a God of goodness, and from hatred to a deification of wickedness. Vainly do we seek escape from good and ill; as our physical life is irreversibly made up of day and night, so our moral life consists of these twain. Even the Emperor of China feels that, when he sets above all his official mandarins two supreme ministers who alone

have access to him at all hours, the "councillor of good," whose duty it is to report righteous acts and sue for their reward, and the "councillor of evil," who denounces misdeeds and demands their punishment. Whence comes this antithesis, inexplicable to the materialist, that splits the world into two halves? For it is not at all clear how atomic motions can be either moral or immoral. No one has yet succeeded in demonstrating the presence of an ethical principle in matter; but if it has no habitat there, how does it come to enter into the products of this matter? Or rather let us state the main problem: How has the undeniable conception of a God, rewarding good and punishing sin, insinuated itself into the world? How has primordial matter, or an "infallible, omniscient ether of the universe," managed to frame to itself a Deity who declares this primordial matter to be merely His creation? For, whether there be a God or no, the belief in Him is fast rooted, and fills all history. If this is only the work of the "righteous and all-wise ether of the universe," that very faith in God is also just and wise, and the whole cause of feud vanishes. Let all parties amicably shake hands.

The materialist, being conscious of the weakness of his position hereabouts, is wont to represent ethics in a most false and partial light as the gradual outcome of historical and anthropological conditions, ever shifting in common with custom, climate and environment. The truth is far otherwise. Four thousand years ago there prevailed in India, Chaldea and Egypt the same morality which we hold now, as their surviving codes of law and religion plainly evince; only formulated in more magnanimous terms than ours, if we may judge from such prohibitions as the Egyptian, "Reville not the deaf; defame not the slave before his master!" or the legal *précis*, "He who seeth a trespass befall and hindereth it not according to his might, is guilty of that trespass." The Greek, again,

recognized the sacredness of misfortune. "Every stranger belongs to Zeus, and every needy man," says Eumæus.<sup>1</sup> How noble is the ethical spirit of Job and how far superior to the modern ! It is the universal subject of encomium in all the epitaphs of antiquity that the deceased had practised virtue and justice, spoken truth, done good and shunned evil. There never has been a nation of atheists, nor one that has not honoured virtue and despised vice, even when it was itself vicious. Immoral tribes themselves have respected chastity, the mendacious and cunning have paid their tribute to truth, the most cruel esteemed meekness and goodness. The most savage and degenerate, however brutal and debased the individual, however licentious the manners of the whole country at certain seasons, have never extolled ingratitude, or eulogized contempt of the gods or of parents, or absolute lawlessness : have never spurned maternal love, or held conjugal fidelity infamous, or execrated manhood, and magnified cowardice, hypocrisy, or perjury in its stead. Socrates inquired of Euthyphron, "whether he had ever heard of a man who doubted that punishment is due to him who unjustly slays his fellow, or does any other unjust act ?" adding, "neither gods nor men have ever dared that."<sup>2</sup> Never has private advantage served as a valid justification for an infraction of the moral law. "May his memory perish," cried the Greek sage, "who first dared to draw distinctions betwixt right and expediency !"<sup>3</sup>

<sup>1</sup> Hom. *Od.* xiv. 57.

<sup>2</sup> ἀνθρώπων ἤδη τινὸς ἤκουσας ἀμφισβητοῦντος ὡς τὸν ἀδίκως ἀποκτείναντα ἢ ἄλλο ἀδίκως ποιοῦντα ὅτιοῦν οὐ δεῖ δίκην διδόναι ; . . . ἐπεὶ ἐκεῖνό γε δῆπου, ὃ θαυμάσιε, οὐδεὶς οὔτε θεῶν οὔτε ἀνθρώπων τολμᾷ λέγειν, ὡς οὐ τῷ γε ἀδικοῦντι δοτέον δίκην.

—Plat. *Euthyph.* 8. (E.K.S.)

<sup>3</sup> "Recte Socrates execrari eum solebat qui primus utilitatem a natura seiunxisset."—Cic. *De Legibus*, I. 33. "Dubitandum non est quin nunquam possit utilitas cum honestate



It was reserved for our "enlightened age" to base ethics on the fluctuating principle of public or private utility. "Strike not thy neighbour dead, lest thou shouldst be struck dead thyself." "Steal not, lest another rob thee." How paltry is this politic philanthropy, and how unutterably alien from the Christian standard, "Love your enemies, bless them that curse you, do good to them that hate you, pray for them that despitefully use you and persecute you; that ye may be the children of your Father who is in heaven. For He causeth His sun to rise upon the evil and the good, and sendeth His rain upon the just and unjust!"

All virtues, according to the materialist, have had their root in egotism, forsooth! Then there must have been a "primordial ego," like the primordial germ, cell, embryo and man, essentially different from the modern, for it seems to be acknowledged on all hands that humanity in the present day no longer hatches any moral qualities! Besides, to the materialist egotism is as hard a conundrum as love. Moreover, as nothing is *per se* good or evil, and it is the event that decides, the end that sanctifies the means, to be consistent a man must be continually indulging in a measure of evil, if it results in a sufficient amount of good. But that principle would have awkward consequences. A miser for instance, is lying ill, the scourge of his neighbourhood, which he leaves to starve. He hoards an enormous fortune that will fall at his decease to his generously disposed wife, who would relieve hundreds of poor people with it, or to his children, who are at present deprived of the commonest means of education. Why should not the doctor resolve him painlessly into his chemical constituents by an overdose of morphia? The good of the many super-

contendere. Itaque accepimus Socratem execrari solitum eos qui primum haec natura cohaerentia opinione distraxissent." Id. *De Off.* III. 11. (E.K.S.)

sedes the volition of an individual, and the individual, moreover, is thus (*ex hyp.*) released from all suffering !

And what of the inexorable award of conscience ? Let us take another case. Suppose that, years ago, when absolutely penniless, I had met, in a solitary mountain gorge, a tourist much my senior, who complained that he was alone in the world and perfectly weary of life, but lacked courage to commit suicide ; then imprudently gave me a glimpse of a pocket-book lined with banknotes, and a few steps farther on turned to look over the edge of a precipice. Suppose that thereupon I snatched his case from him, and pushed him over the brink into the seething cauldron below, which engulfed his mangled remains for ever. No hue and cry has ever been raised about him ; no one witnessed the act. His money laid the foundation of a competency ; and I am now a man of position and credit. Why is it that ever since that day I have never been able to sleep peacefully, and would give a mountain of gold to see him standing on that spot alive ?

The materialist informs us that the expedient is good, the inexpedient act bad. But who is to decide what is expedient, what not ? Of course, the man concerned ; he alone can know. It is manifest to what rare consequences, though judicially (and indeed otherwise) very impolitic, this doctrine leads us. The futility of the favourite pretext of self-interest, as well as expediency, to secure the stability of the world, may be seen every day in the case of thousands who ruin their families and themselves by drunkenness or vice, although perfectly aware that such a life is "disadvantageous." The self-interest of the Romans and of the planters in the preservation and protection of their slaves never deterred them from maltreating and occasionally murdering them. What does a Nero or an Ivan the Terrible, to whom it affords keen satisfaction to wreak his brutality on his fellow-creatures,

and who has the power to do so, care for prudential maxims or punctilios ?

Far more expedient than temporary expediency, that can be ascertained but partially and imperfectly,<sup>1</sup> (taking even this low ground), are Christian morals, according to which there is such a thing as absolute right and wrong, and a standard by which the whole world will one day be judged. All must admit that this principle has effected much more good and obviated much more evil since the world began, and is therefore much more useful and "judicious," than any form of materialism.

But we may learn from his chagrin when twitted with the immorality of his system, and from his endeavour to attach an ethical value to it, how little its votary can liberate himself from the categorical imperative of duty, from the inward precept to do good and eschew evil. Were he consistent he would answer complacently to the above-named taunt, that there is no such thing as morality or its contrary ; nothing but a prudential wisdom. For that matter, we too might assent to the tenet that the expedient is good and the inexpedient bad, were it conceded that the fear of God is expedient, and iniquity the contrary. "Sin," says the Scripture, "is the destruction of nations." Again, we could acquiesce in the maxim that "philanthropy is true morality," if permitted to write above the requisition—enounced for that matter far more distinctly

<sup>1</sup> "The doctrine of utility (as a criterion of morality) is a mere barren theorem, and of no practical value, since the consequences of all important actions expand themselves through a series of undulations successively good and evil ; and of this series no summation is possible to a finite intellect. In its instant effects a given act shall be useful : in its secondary effects perhaps mischievous : in the tertiary undulation it shall revive into beneficial agencies ; and in remoter cycles travel again into evil."—De Quincey : *On the works of Mac-kintosh* (xi. 73). (E.K.S.)

in the Bible—that “we should love our neighbour as ourself,” the higher law, “Thou shalt love the Lord thy God with all thy heart, with all thy soul, with all thy mind, and with all thy strength.”

The materialist is wont, in congruity with his ethical teaching, to inveigh against the God of Christianity, who is so harsh and decrees so much suffering, wretchedness, trouble, and distress, dearth and pestilence, such earthquakes and inundations, hurricanes and disasters of all sorts for mankind on land and sea. Yet a moment later he assures us that there is no such God, and that his divinity, primordial matter, *alias* substance or “interstellar ether,” *alias* “world-soul,” is the agent in all events whatsoever. In which case his god is no better, and we are entitled to revile this deaf and dumb and withal purblind idol, primordial matter, “who inflicts so much suffering, wretchedness,” etc., as he informs us himself.

“If materialism be true,” the average man may well retort, “cursed be this eternal matter and its laws, this unconscious idiot which created us without intending it, or knowing why; that helpless block which has implanted these ideas of right and truth, deity and guilt to fret and delude us! And accursed be that process of evolution which is ever multiplying the agonies of the world! I seem dimly to recall the time when I was a purple alga, a *Delesseria sanguinea*, firmly cemented to a rock where the pellucid, eddying tide rocked me gently twice a day, and bathed me in suffusions of stimulating ozone and iodine, whilst I was cheered by the beams of the sun, alternately near and distant, as the tide ebbed or lapped over me. When I was a gorilla I was happier still! Feared by other animals, and fearful of none, I roved heedlessly with my mate and young through the virgin forest-depths, stocked with abundance of food—far stronger and healthier than I am now that day after day I sit tethered to a desk



or immured in a factory. Then I was not concerned with making ends meet," or with "social problems," "competition," or treatment for "nervous collapse." And the next stage of evolution will inevitably introduce me to new phases of pain! With a yet finer and more delicate organism, equipped with senses of still keener susceptibility, what may I not expect to endure from external influences, exposed as my more intricate bodily mechanism will be to new forms of complication! But others tell me that whilst the race will probably experience such evolution, the individual will be insensible to it, because decomposed before then into his chemical constituents. And is all my thought pain and effort only a chemical combination? Then my whole soul boils with rage and exasperation against this purposeless universe, these vacant flourishes scrawled by blank matter on the wall in order to beguile the tedium of its apathetic eternity; and with loathing against myself, the despicable plaything of unintelligent, inscrutable forces. I am not to be entrapped by virtuous phrases about the dignity of science, or by exhortations to sacrifice myself for the welfare of my fellows. For what? The gratitude of posterity? And what care I for that, or for a paltry bust or statue, if I am meanwhile resolved into gases, or into a weed that grows by the roadside, or crawling about as a constituent of an earth-worm? I should be a fool to stint myself of the slightest indulgence, or to trouble for a single hour about religion, humanity or topics of moral obligation. Give me intoxicants or an opiate; let me at least forget my wretchedness! There remains one resource, however, the revolver or morphia-flask, when I am sick of my misery; and then I may flit about at my ease, in space, I trust, in the form of oxygen or nitrogen. But shall I be quiet even then, what with these restless atoms, these tyrannical forces of nature? Is there no rest in the universe anywhere?"

If we must undergo these strokes of chastisement, how much better to "fall into the power of God than man!" Far rather would we suffer at the hand of a personal Deity, and for a specific end, than from a callous "physical force," which hacks at a venture, knowing neither why nor for what object! But there is one momentous difference which our opponents invariably ignore. Whilst their deity has ever been emptying vials of pain and woe on his luckless progeny, and will for ever do so, till at last, happily for life in general, he becomes stark and numb, our God sends His children a measure of pain and suffering for their correction and reformation during a mere second's space in the reckoning of eternity; and He who knows each desire and yearning of the human heart, which is His own handiwork, has pledged Himself that "there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain; for the former things are passed away. Behold, I make all things new!"

The materialist is most illogical of all in his repugnance to, or, not to mince matters, his vilification of godliness in general. He is never weary of railing at believers in a God of Righteousness and Love, who has Himself borne our transgressions that we might have a sure and certain hope of everlasting felicity. Spiller styles believers in miracle the "stupidest of men" (of which the examples of Luther, Leibnitz, Newton, Coleridge and a few others are ample evidence!). The anonymous author of the *Confession of Faith of a Natural Scientist* maintains that "all the praying under the sun has never removed a tittle of misery or vice," notwithstanding that thousands of upright men testify the contrary from their own experience, and though even the Salvation Army (whatever may be thought of it in other respects) has actually reclaimed hundreds from drunkenness and vicious courses by the medium of prayer. The celebrated author of *Kraft und Stoff* announces that

"there are no spirits. No dead man has ever risen again." How does he know that? Such is what it pleases him to call "exact science, void of all prepossession!" These philippics against religion betray a consciousness of weakness and defeat. In fact, how can the materialist pretend to impugn the law of Christ by laws of nature, "the powers of the world to come" by means of natural forces, or the work of the Spirit by a discussion however "subtilized," or to controvert and abolish by the differential calculus or the infinitesimal method the graces of love, faith and hope? He himself feels that his best-contrived projectiles do not soar so far as heaven; every Christian who is such indeed stands outside his range. And with what other weapons can he discomfit him? Napoleon I. used to say that no man could resist public opinion. But the Christian is undaunted by public opinion; every instance of martyrdom has borne testimony to that. "Greater is He that is in you," Christ has told us, "than he that is in the world."<sup>1</sup>

By this prejudgment of all religion, and bitterness against it, the materialist sets himself in diametrical opposition to his own scheme. If all that exists is, as remarked above, merely the fated, orderly effect of an unconscious yet most rationally behaving material principle, Christianity, in common with other religions, forms no exception, and he ought to regard this world-moving phenomenon with interest and goodwill as one of the chiefest products of his beloved matter. The Hegelian maxim, "Whatever is, is rational," is in fact adopted by materialists such as Spiller. All religious systems are therefore "rational" too. If, as Tyndall fancies, the seeds of religious, as of all other phenomena were wrapt in the fiery primordial nebula, how can we Christians help it that these germs have evolved themselves with rather more fertility than those of the

<sup>1</sup> This message is given through the apostle John (1 John iv. 4). (E.K.S.)

materialistic philosophy ? There are no "hallucinations" in the realm of matter ; only trains of causes and effects. How then comes it that the metaphysical conceptions of the immortality of the soul and the resurrection of the body, of an invisible, yet influential world of spirits, of miracles and miraculous cures, and of demoniacal possession and prophetic inspiration, are found among the simplest and least cultivated savages, such as the Koriaks, Samoides and Lapps ?

But even if religion were only founded on hallucinations and superstitions—meaningless words in an universe of eternal matter—he who believes that all ideas, true and false, will one day, when the universe congeals, merge in a sphere of hydrogen, should at any rate display indifference towards a mere illusion. Hartmann in fact does say, "*All belief, even this of mine, is of no value*"; and that is consistent. But if it be certain that these same illusions have enabled millions to live patiently and die in peace (and history presents us with irrefutable proofs of that fact), he should have hailed them as a magnificent anodyne with which to meet the ills of life. He should not only have granted the use of the narcotic to every living creature ; he ought warmly to recommend it, if he is consistent, and indeed to make use of the harmless prescription himself in life and death, as an anæsthetic guaranteed by so many testimonials ; particularly since it has not come to our knowledge that any materialist has yet departed in cheerful resignation to the will of "eternal matter," or in jubilant anticipation of the "stoppage" of the universe. He insists that death makes an end of all. Accordingly no one will detect in the subsequent modifications of hydrogen, oxygen, etc., into which he will shortly be resolved, whether he figured heretofore as a materialist or methodist. In his view all the progress and splendour of science is but an unintelligent play of atoms, and desists completely with



our earth ; and so it is of no consequence whatever to him what relation we bear to these merely physical phenomena. In spite of its disclaimer, the motto, " Let us eat and drink, for to-morrow we die," remains the sole consistent principle and ultimate dictum of materialism.

But if this system of negations does not content us, and we inquire (agreeably to the direction, " by their fruits ye shall know them ") for the effects of the two chief philosophies, the theistic and the atheistic, respectively, we are astounded at the balance which is to be credited to the one, and the enormous deficit to be debited to the other. A single fact ought to be enough to convince those who have neither time nor skill to examine the philosophical value of either system, or to appraise the truth of the one and the hollowness and falsity of the other. When has any great, good, veritable, or noble achievement been wrought that did not rest in the last resort on a belief in God, the immortality of the soul and a final recompense ; in short, on the faith that beyond this visible, tangible, perishable world there lies a higher and imperishable, of which the visible is but an adumbration and a symbol ? How do nations become great and prosperous, powerful and respected ? By preferring above material possessions, pleasure and wealth and their own self-interest, the moral heritage of godliness, righteousness and purity, the " hope of immortality " ; and their greatness lasts just as long as they retain their integrity. When is their fearlessness, energy and sobriety surrendered ? When do their intellectual superiority and vigour, their self-confidence and idiosyncrasy begin to decline, and become quickly tainted with covetousness and absorbed in the craving for sensualistic indulgence ? So soon as they become materialists.<sup>1</sup> That is a historically accredited

<sup>1</sup> " Dis quod minorem te geris imperas ;  
Hinc omne principium, huc refer exitum."

—Hor. *Carm.* iii. 6, 5, 6. (E.K.S.)

truth which no criticism, however philosophical and scientific, can subvert. Where are the great men, the patriarchs, prophets and apostles, moral heroes and lawgivers of atheism ? Has it ever produced one man who has attracted to his system for centuries hundreds of millions, like a Confucius, or Buddha, or Mohammed ? Can it boast of one lawgiver like Solon or Lycurgus, to omit Moses, beneath whose iron code a nation has bowed for three thousand five hundred years ; or a poet like Homer, Dante, Shakespeare, Milton or Virgil ? Can it point to a *single* artist of the rank of Michael Angelo, that grand sculptor, painter, architect and poet in one, many of whose sonnets are ardent prayers ; or Leonardo da Vinci ; or like that sincere Christian and master of majestic harmony, Sebastian Bach, or such as Handel or Haydn ; or even a leader of Luther's strong personality ? How is this reconciled with the favourite assertion that religion has a stultifying effect ?

The truth is that this materialistic hypothesis is at odds with the entire aspect of the universe, contrary alike to external fact, and the inward voice of the soul. Man observes nature and all that exists, like a river chafing and swirling in ceaseless unrest as it plunges onward, engaged, as it were, in some tremendous race through abysses of space and geological epochs of time to some unknown, fixed, eternal goal, the terminus and fruition of all longings and aspirations ; and he also sees mankind itself, athirst for light and truth, strength, liberty and life, held in chase by mysterious powers, sweep like a tornado over the earth, its generations emerging out of darkness, and a few years after buried in darkness again ; and feels in the depth of his heart, whence the fountains of life well forth, that this tumultuous agitation is not meaningless or nugatory, but has its destined end. When we read human history, even by the light of nature, we perceive that the joy and strength of man's life have ever sprung

from ideas of beauty, truth and goodness, and that all nations have uniformly traced these ideas to the being of a personal God. We see further that all that is august and permanent in the world has originated with men who have had faith in Him, and have wrought in the sense of His existence, even when they were far from being Christians. Those conquerors and captains, statesmen and legislators, sages and students, on whose intellectual stores mankind has fed for four thousand years, and in whose beams it has basked, have believed in a Divine Being. And yet, forsooth, these men, with all those "servants of God" whose names are graven as with a pen of diamond on the scroll of history, were only poor, blinded fanatics, self-deluded babblers! Then of what use are religion and morality, justice and order, art and science, idealism and poetry, even "illumination" and progress? The universe is a circle without a centre, an undesigned, empty phenomenon, an interrogation to which there is no response. "Let us eat and drink; for to-morrow we shall die."

But, should you tell me that you are afflicted with cancer, my reader, and have no appetite for food, or have passed through such tragic experiences that all your joy is turned to gall, or if you are sick and feeble and face to face with the tomb, I have no counsel for you. You have heard these wise men declare, that they have ascertained that you are sprung from unsympathetic, immutable matter. Despair then and die! What does it reck of your weal or woe? It does not even know that you exist! Die then in despair! For the sombre message of this (so-called) gospel of "enlightenment" runs thus: "Woe to them that are not in good estate here, for other life is there none! Woe to them who suffer wrong here, for it shall not be righted yonder! Woe to all that weep, for they shall never be comforted! From nothing do we come, we and all our deeds are nothing, and soon shall we sink without hope into eternal inanity."



Light, on the contrary, diffuses itself over all creation to the theist. "In the beginning God created the heavens and the earth." We listened with incredulity and repugnance to the creed that the unconscious had produced the conscious, the casual engendered the intentional, matter begotten spirit, and death life; but our heart revives, our spirit is exhilarated, and we discern the face of truth again, when we hear the proclamation that the perishable issues from the Imperishable, the mutable and inchoate from an everlasting Being, that this rill of earthly life trickles from a shoreless, unplumbed ocean of vitality, that our tiny taper borrows its beam from the primal Sun, and that the ray of joy and happiness for which our heart so pants is but the fitful, flickering glimmer of that eternal felicity with which we shall as Christians one day be satisfied. At these tidings our soul expands and we begin to understand what we are. We discern that light is stronger than darkness, affirmation than negation, love than hate, life than death. That assurance is in concord with the universe; it harmonizes with the aspect of the sun in his heavenly mansion and the beauty of the floweret by the wayside, with the melody of the lark and the woodland songster and the verdant mantle of the spring; with everything on earth meriting the name of life! Here we learn the reason of the passionate aspiration of all creation towards infinity, that reaching out towards heights above and depths beneath, that delight in daylight and action called "vital energy," which is discernible in all living things. All seek their Fountain-head! And we might gather even from this potent yearning within us for light and fulness of life that we are sprung from the living God who dwells in light eternal and not from dead, dark matter; else it would be death and not life for which we should gasp.

But he who has observed, or better still experienced, how a believer, wasting away, it may be by an incurable



disorder, afflicted night and day with bodily pangs, and in addition laden with pressing cares about this life ; the present scarcely endurable, the future in man's reckoning very sad and hopeless, human aid very inefficient ; yet all the while can rejoice blessedly in the steadfast conviction that he will one day " see God for himself and his own eyes behold Him, and not a stranger,"<sup>1</sup> is no more to be trepanned by the most scientific declamations of materialism. He has tasted the powers of the world to come, and has palpable proof that they preside here, and that poverty and shame, care and pain disperse in their presence as mist before the sun ; and when he is favoured with the explanation that these are idle delusions, he replies by a tranquil smile.

We bid farewell to materialism, rather disenchanted and grieved than provoked. For we can remember the day when we approached its shrine with high anticipations, expecting to find a temple of Baal indeed, but still a temple. We thought to have entered a stately nave supported on the massive pillars of its established axioms, to have seen above our heads the overspanning arches of its symmetrical system, and underneath the light of illumination streaming through broad many-coloured panes ; then, advancing into the choir, to have found a train of venerable priests in white stoles assembled round the altar of science, and chanting in elaborate antiphony some anthem in honour of their goddess. Such were our anticipations. But how different the event ! We encountered a hubbub of wrangling sophisters, carping at one another, and each striving to outvie the rest in clamour ; and fancied we had stumbled on a popular festival or country-fair, where discordant shouts resound from every separate booth ! Here it was the " wonderful Protoplasm " which evolves everything out of itself ! there the " nescient, omniscient Ether of the Universe ! " in one spot " genuine life-germs, procured

<sup>1</sup> Job xix. 27.

direct from space, guaranteed to be ten million years old ! ” round the corner, the “ Plastidule ” or thinking atom, the “ very latest invention ! ” And on an eminence commanding the whole scene stood a stately, but barricaded edifice bearing the oracular inscription : “ The seven Riddles of the Universe, or the Great *Ignorabimus* ! ”

Is this cosmology, eloquent only of force and matter, to which it would fain reduce all things, yet driven to confess that it is ignorant what force and matter are ; this school of wisdom which neither understands nor meets the craving and questioning of the human heart, and accounts the best thing in life a delusion, the profoundest a cheat, and suicide to be the goal and end of creation ; this philosophy, oblivious of love faith and hope, acknowledging nothing as absolutely true or good or beautiful, which denies me both a soul and a heart ; this flimsy, hypothetical, nondescript scheme, explanatory of nothing divine nor human, neither of spirit nor matter, life nor death, art nor science, guilt nor justice, morality, conscience, nor religion ; *is this propounded as a scientific philosophy of the universe ?*

There is a trinity of forms of unbelief. The lowest grade is that of materialism ; the more refined philosophical pantheism of Spinoza and Hegel is the second ; and the third species of infidelity is that wretched spirit of impiety which signalizes “ advanced theology,” and sets itself to the business of dragging holy things in the mire, and stigmatizing the word of God as a fabrication of forgers and imbeciles ; the same spirit, conscious of the truth, yet inimical to it, that led the Pharisees of old to say to Christ : “ Thou castest out devils by Beelzebub, the prince of the devils ! ”

Some have lately asserted that the first of these theories of negation has been routed. But that is not the fact. Though natural scientists are beginning to comprehend that the pompous pretensions of Moleschott, Vogt, Haeckel and Büchner have led them into a blind alley, they have

not struck into the right path yet. Their wayward, misty, dualistic and pantheistic, semi-theistic or atheistic notions of spirit and matter, idea and substance, *noumenon* and *phenomenon*, energy, vitality, conscious and unconscious mind and the rest, are little better than the "universal ether" of Spiller, who had no mercy on other people's materialism. As long as any system does not clearly admit a personal Centre and Sun of the universe, the Fount of all life and intelligence, it remains at bottom a materialistic influence, and is hostile to a religion issuing from the only true God, who alone can be our Saviour ; for who but its Creator can blot out the sins of a lost world ?

Of what avail would a theoretical and nominal refutation of this school be, if we are still to see it practically more and more widely disseminated in modern life ? What is this "broad-mindedness" that is taken for granted in the case of all educated persons, and conformably to which a thoughtless crowd of other people live, the burden of "*fin de siècle*" novels, plays and art, this gospel which thousands of scholars inculcate, writers discuss, poets celebrate, and speakers preach to us, which is inhaled in the air of our streets, clubs, and social gatherings ? What save the supremacy of matter over spirit, or rather the blank repudiation of the latter, and the installation of pleasure as the supreme end of life ? Is not the underlying principle, "Let us eat and drink, for to-morrow we die ?" In which event truth is of no moment ; when the question is mooted, like Pilate, they turn away and "will not stay for an answer."<sup>1</sup> Seat these people by their decanter, and that will be their chosen idol which sets them soonest at their ease.

Yet materialism can never become generally ascendant. The world has never yet been of that sect. A hundred million African negroes and Arabs, eight hundred and fifty million Asiatics, that is, more than half the human race, are

<sup>1</sup> Bacon : *Essay on Truth*.

not materialists. The tiller of the soil, that iron backbone of the human family, and the fisherman and sailor, the forty millions of Russian *moujiks*, Esquimos and Patagonians, Kaffirs and Indians, and the savage or "child of nature" in general, are nowhere materialists. They all believe in God and the devil, in another life, in prayer and sacrifice, and a world of spirits;<sup>1</sup> all, however degraded and vile, have impulses towards doing good and forsaking evil; stand in dread of future punishment and cherish a hope of future bliss. For their life is spent amid natural scenes where they trace the "breath of life" of an invisible Creator, and see the prints of His footsteps. Neither the child nor the aged are materialists; at the sight of death, as Cicero noted, the infidel turns believer.<sup>2</sup> It is only where men, unnaturally, congested like the cells of a honeycomb, with no room to breathe, and so fevered by the struggle for existence that they have forfeited the power of calm reflection, lose their primitive features, that the blinded soul lapses into these artificial speculations. Were they transplanted from great cities into the wilderness, set on the mountain-top or tossed on the ocean, they would soon be materialists no longer.

For their creed is not and never will be the current faith of normal man. It shirks the great problems of human existence, whilst robbing it of all that renders life or death endurable, and gives in exchange, notwithstanding the repeated claim that it builds only on tested facts, mere hypotheses, supported by the emptiest of vapourings. It has never appeared except as a morbid secretion, in seasons of moral laxity and putrefaction. Whenever the world

<sup>1</sup> As is shown with great learning by Dr. Ebrard in his *Apologetik* (vol. ii.), with special reference to common traditions.

<sup>2</sup> The reference is probably to Cicero's remarks on the dying acts of Epicurus (*De Fin.* ii. 31). (E.K.S.)



(which even in Scriptural reckoning denotes the foremost race for the time being) swerves from the track marked out for it by Providence, and instead of living conformably to outward nature<sup>1</sup> as a whole, spends its strength in a spasmodic exaggerated pursuit of a single idea ; when the Greeks worship the beautiful apart from the good, when the Phoenicians and Carthaginians absorb themselves in mercantile enterprise, and Rome covets universal empire unscrupulously snatched by right or might ; this obliquity of aim revenges itself : an obstruction of the circulation and feverish temperature sets in ; and bald materialism develops at the centre of the system as a periodically recurring symptom, accompanied by a vitiation of morals, a mendacity and dissimulation, a venality of officials and dishonesty of individuals, of which we experience a mere foretaste in France and America at the present day.

It is true the Romans of the empire, battenning on the plunder of the world, jaded by pleasure, came to applaud the utterance of a player in the amphitheatre, "After death,—nothing ! Death itself—nothing !" But the provincials, on whose corn and labour they throve, still revered the gods ; and when their belief had been sapped, the empire collapsed beneath the strokes of the barbarians ; for then, when his steersman asked the question, "Whither ?" Genseric, king of the Vandals, cried, "Bring me to the nations with whom Heaven is wroth !" The same conditions preluded the French Revolution. Some thousands of Parisians, the court and nobility *par excellence*, made a jest of religion and of life, whilst weeping millions were eking out a wretched livelihood by cruel toil. Then broke loose the tempest ; for the avenging Furies were already on their track ; Danton, Robespierre

<sup>1</sup> "They express nature best who wander least from her safe leading, which may be called regenerate reason."—Milton : *Prose Works*, ed : 1697, p. 329. (E.K.S.)

and Marat were born!<sup>1</sup> Doubtless in the uproar the insurgents flung away religion as an appanage of the old corrupt order; but they speedily restored it, when they had been taught the lesson that the globe cannot revolve without an Almighty hand. Then Châteaubriand wrote the *Génie du Christianisme* and Lamartine his *Harmonies*.

Materialism will never mount to universal dominion. It has not stamina nor implements for the task; no man will live or die for the sake of protoplasms or sentient atoms. An overplus of negation and deficiency of positive doctrine confer no strength. For the profound thinker it is too shallow; but too tame and insipid for the irreligious mob, or the Anarchist of the future. Having gazed sufficiently at the gift, creation, and disparaged that, in time it will become a necessity to blaspheme the Giver Himself; for it is but a meek, irresolute, mongrel phase of impiety to entrench onself behind atoms and primordial cells! It is true, fools say in their hearts, "There is no God"; but Satan gnashes his teeth and vociferates: "Godliness is a lie! Touch them, and they will curse Thee to Thy face!" (Job i.). The earth is ripening to that apostasy of which the prophetic second Psalm speaks: "The kings of the earth set themselves and the rulers take counsel together against Jehovah and against His Anointed, saying, Let us break their bands asunder, and cast away their cords from us!" when a hatred of God shall grow up, such as is only possible where a consciousness that there *is* a God underlies the denial of Him; for where nothing exists, enmity cannot be felt. But the prophet and psalmist proceeds: "He that sitteth

<sup>1</sup> Like the lion's whelp in the magnificent figure of Aeschylus (*Ag.* 696-712), the hitherto bridled savagery, roused at last, avenges itself a hundredfold on the corrupt society that has nursed it into strength. (F.K.S.)

in the heavens shall laugh : the Lord shall have them in derision ! ”

Thus, on closer and unprejudiced examination, the Christian cosmology proves to be more natural, true and satisfying, than the anti-Christian scheme of an irreflective and biassed multitude. And so is the Christian religion ; because the answers given by the Bible to the problems of life correspond best with the facts, and present at the same time the truest and most scientific philosophy. Whereas scarcely one out of a thousand non-Christians, taking the human race all the world over, concerns himself seriously or deeply with the mysteries of existence, and the vast majority admit no other aims in life than gain and enjoyment (even as Christ said, “ What shall we eat, what shall we drink, wherewithal shall we be clothed ; after these things do the nations seek ”) ; every genuine Christian is wittingly or unwittingly a genuine philosopher, whose most earnest task in life consists both in certifying the agreement of these Biblical solutions from day to day with the life within and without him ; and in bringing, as Plato required a true philosopher to bring, all that he does and permits to be done no less earnestly into unison with his philosophy of the world. His intuition of eternal truth enables him by divine grace to ascertain what is just and true, and “ to maintain good works,” and conversely, those fruits of his by a beautiful reciprocation carry in themselves the proof that the principles from which he set out are true. For what save truth can gender holiness ?

The Christian, therefore, believes nothing contrary to, nothing in defiance of science : he believes, rather, because he recognizes, upon deliberate examination, that the science of faith harmonizes better with the record of existence, and is accordingly more authentic and “ scientific,” than the science of unbelief.





# INDEX

*The numbers indicate pages, but it has not been thought needful to distinguish between references to the text and to notes.*

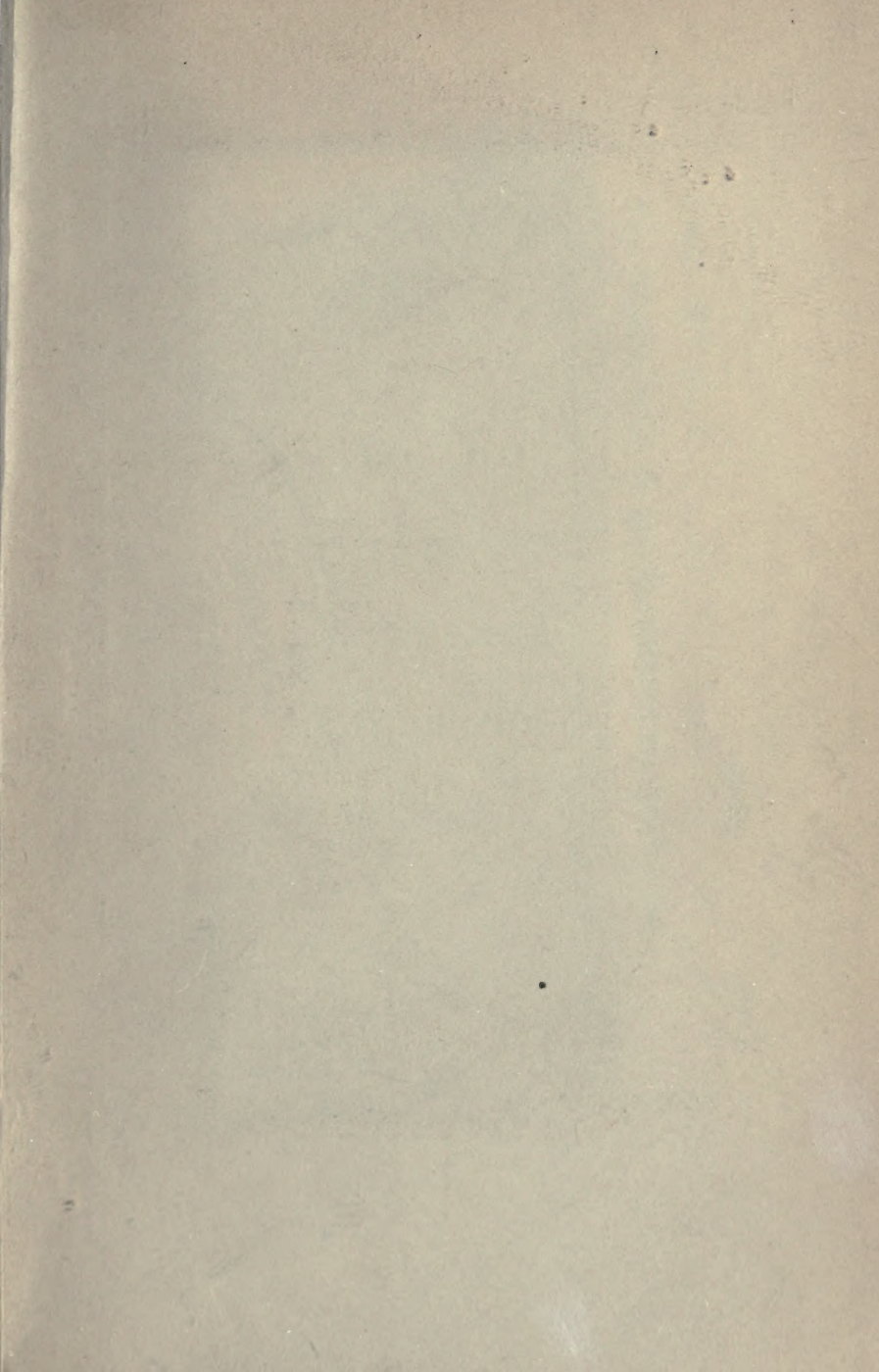
- Aeschylus, 348
- Antiquity of man :  
 Chronology, Egyptian : Anderson, 34 ; Borckhardt's test of, 34 ; Winckler on Babylonian, 34
- Excessive periods, Lange on, 28
- Man and the mammoth, Figuier, 31 ; mural drawings, Dennert on, 32
- Scales of duration, Bettex on, 27
- Skulls, primitive, 13 ; Broca on, 33 ; antiquity of questioned by Boyd Dawkins, 28 ; Engis-skull, Huxley, Landzert and Lyell on, 30 ; Neanderthal-skull, Davis Pruner-Bey and Virchow on, 30 ; Fouillée, Fraas, Haeckel and Prichard on theories of racial variety, 31
- Stone and bronze ages, length of : views of Fraas, Morlot, Troyon, 29 ; contemporary, 27, 8 ; bronze age at early Troy, 29 ; Greek spoken in bronze age (Max Müller), 29
- Tertiary man, Beck, Ranke, Fraas on, 28
- Ape-speculations, Boyd Dawkins and Figuier on, 30, 33 ; man not descended from anthropoid apes, testimony of Dana, Müller, Quatrefages, Virchow and Zittel to this, 151, 2
- Arago, 246
- Argyll, Duke of, 139, 289
- Aristides the rhetorician, 79
- Aristotle, 134, 221, 254
- Athenaeus, 18
- Augustine, 240  
 On miracles, 169
- Baader, 38
- Babbage, 119, 175
- Bacchylides, 171
- Bacon, on the poet, 50 ; subtlety of nature, 154 ; love of lies, 279 ; partial judgment, 327
- Bentley on materialism, 287, 297, 304
- Berkeley, 233
- Bessel, 245
- Berthelot, Prof., 315
- Bettex, 27, 29, 59, 188, 313
- Bible, The, and nature, 185-210
- Boehme, Jacob, 72, 89, 128, 186, 212, 253, 306, 9
- Borgias, Rome of the, 40
- Boyle, Robert, 123, 127
- Brown, Dr. Thomas, on miracles, 170
- Browne, Sir Thomas, 9, 48, 53, 174
- Büchner, 62, 66, 240, 290, 336
- Bunge, 297
- Burke, ix., 91
- Butler, Bishop, 37, 175
- Candlish, 47
- Carlyle, 279
- Champfleury, 251
- Chemical phenomena, 63-74
- Cicero, 61, 73, 161, 279, 306, 319, 330, 346
- Claudius, Matthias, 265

- Coleridge, 48; on Scripture and scientific language, 189, 324  
 Copernicus, his epitaph, 273  
 Cowper, 310  
 Criticism, Higher, ix., 179, 200, 253 *sq.*  
 Cuvier, 147, 274; on Gen i., 191  
 Daguerre, 247  
 Dante, 327, on the victorious power of the gospel, 278  
 Darwinism, examination of, 138-60  
   Abandonment of, by Prof. Fleischmann: synopsis of his lectures on, 153-4  
   Adverse verdicts on: Bischoff, Dubois Reymond, Liebig, Wilser, 147; Müller, 148  
   Anthropoid ape, agreement of Virchow, Quatrefages, Zittel, Müller and Dana, that man is not evolved from, 151, 2  
   Biogenetic ground-law of Haeckel modified and restricted, 153  
   Correlations unexplained by, 139  
   Decline of, 152  
   Deep-sea life, Hensen's researches into: uniformity absent here, 150, 246  
   Embryo, no common (Vogt), or cell, 150  
   Evolution, no simultaneous, 146; complexity of (Vogt), 149; Hugh Miller and Fleischmann on, 147; Yung's picture of future, 155; Clemenceau's, 156; caste-system not productive of, 155  
   Fossils irreconcilable with, 144-6; not to be explained genealogically, 143; Hertwig's confession, 153  
   Horse, genealogy of, 148, 153  
   Lamarck's theory, 138  
   Limits, multiplicity within, 143; of plasticity, 140, 2  
   "Missing Links" still missing, as *Tocornithes*, 147, 153; admitted by Hamann, 148; Kalisch, on their indispensability, 148; not supplied by *archaeopteryx*, *ceratodus* or *merychippus*, 153  
   "Natural Selection," 139, 148; confession of Wagner about, 148  
   Pernicious effect of, 156, 9  
   Philosophy, not science (Denert), 153  
   Rejects personality, 156, 158  
   Sauria, not evolved (Steinmann), 146  
   Species, Cook's definition of, 140; type, immutability of, 143; Dawson on, 140; reversion to, 140, 5  
 De Morgan, 7  
 De Quincey on providential removal of objects of pilgrimage, 39; on miracles, 170; Scripture and scientific language, 188; impracticability of the utilitarian criterion, 333  
 Descartes, epitaph of, 58; 154  
 De Stael, Madame, 113  
 Dewar, Prof., 71, 93  
 Diaz, Bernal, 19  
 Domitian, 311  
 Doskojewsky, 267  
 Dubois-Reymond, 24, 62, 147, 242; on "riddles of the universe," 221, 230-2; on inadequacy of scientific explanations, 241; on "sentient atoms," 303  
 Ebrard, 346  
 Electricity, 93 *sq.*, 247  
 Empedocles, 138  
 Ether, Interstellar, 75, 222, 289  
 Euler, 76, 274  
 Faraday, 275  
 Fechner, 300  
 Flammarion, 16; on molecular forces, 69, 70, 135, 160, 246, 318

- Fleischmann, Prof., on evolution, 143, 147, 153-4  
 Forbes, Duncan, 213, 241  
 Forbes, Edward, 245  
 Foster, John, 288  
 Fraas, Prof., 28, 29, 31, 33, 193  
  
 Galileo, 132  
 Geibel, 223  
 Goethe, 120, 219, 236, 245, 319  
 "Goethe-Myth," The, of A.D. 3000, 256-60  
 Goldsmith, Oliver, 35  
 Grotius, 215  
  
 Haeckel, 31, 148, 153, 247, 283, 296, 301  
 Hamilton, Sir William, 223, 6, 9; on human nescience, 240; on mind and matter, 301  
 Hanno's *Periplus*, 16  
 Harnack, 166  
 Hartmann, Von, 25, 290, 3, 296, 300, 310, 338  
 Hegel, 148, 244, 337  
 Helmholtz, 227, 248  
 Herder, 38, 223  
 Herodotus, 14, 19, 264, 267, 337  
 Herschel, Sir William, 274  
 Hesiod, 29  
 Hippocrates, 79  
 Holzer, Prof., 22  
 Homer, 1, 255, 284, 5, 330  
 Hommel, Prof., on Daniel, 255  
 Horace on education, 120; 161; on national prosperity, 339  
 Howorth, Sir Henry, 32  
 Howe, John, on materialism, 304  
 Humboldt, 217, 288  
 Huxley, 22, 30, 247  
  
 Jacobi, 6  
  
 Kant, 24, 230  
 Keats, 205  
 Kekule, 221  
 Kelvin, Lord, 67, 292, 9  
 Kepler, 273  
 Klein, 304  
  
 Lange, 273, 283; on Biblical chronology, 28  
  
 Lavoisier, 274  
 Leibnitz, 23, 224, 274,  
 Liebig, 64, 250, 274, 5; on evolution, 147; on materialism, 300  
 Linnaeus, 274  
 Locke on borrowed opinions, 132; on unsuspected influences, 249; 224  
 Lockyer, 78, 85  
 Lubbock, 225  
 Lucan, 73, 236  
 Lucretius, 6; on the mania for travelling, 113  
 Luther, on the study of nature, 126; 326  
  
 Macaulay, 101, 244  
 McCosh, 225; on limits of human power, 86  
 Mädler, 275  
 Mandeville, Sir John, 80  
 Margoliouth, Prof., ix.  
 Materialism, 287-348  
     "Atomic consciousness" absurd, 301  
     Expediency no standard, 332  
     Forces, eternity of, 294  
     Life Consciousness and Death unexplained by, 296-301  
     Matter, Eternity of, 290  
     Moral impotency of, 305-41  
     Pessimism of, 310  
     Vulgar ideals of, 314  
     Universality of, unlikely, 346  
 Maudsley, 167  
 Mayer, Robert, 63, 67, 275, 294, 297  
 Menant, 14  
 Mendeléeff on scales of elements, 64; definition of molecules, 68; 85, 135  
 Meyer, 221  
 Mildenhauer, 192  
 Mill, 8, 84, 172, 5  
 Miller, Hugh, 147, 193  
 Milton, on music of the spheres, 61; on stellar influences, 249; on divine interventions, 171; 191, 347  
 Mohammed, 278, 9  
 Müller on evolution, 147, 150,

- 151; on ultimate principles, 223; 246
- Napoleon, 5, 280, 337
- Newton on ultimate nature of phenomena, 62; of gravitation, 222; 274, 277
- Ovid on ether, 75; Pythagorean flux, 158
- Palmieri on "helium," 77
- Pascal, 113; on infidel credulity, 174, 216; definition of religion, 268
- Petrarch, 242
- Pfaff, 13
- Pictet, Prof., 72, 297
- Pindar on divine power, 171
- Proctor, 23
- Plato on indemonstrability of first principles, 62, 219, 20; 230, 265, 266; on ethical principles, 330, 349
- Pliny, 310
- Plotinus, 253
- Plutarch, 18, 95, 236
- Progress, Christianity and material, 36-47; questionable modern, 10-26; actual, 48-56
- Quatrefages, 30, 151
- Quenstedt, 145, 192
- Ramsay, Prof., 246
- Ranke, Fr., 22, 244, 275
- Ranke, Dr. J., 28
- Rawlinson, Prof., 16
- Rayleigh, Lord, 215
- Rogers, Henry, 166, 176
- Röntgen rays, 79, 168, 250
- Schelling, 24, 285
- Schiller, 98, 284
- Schliemann, 255
- Schopenhauer, 23, 25, 68, 233, 243, 284, 5, 296, 318
- Schwann, 307
- Science, Modern :  
Circumscribed domain of, 264-72  
Consistency with faith, examples of its, 272 *sq.*
- Critical pretensions of, 253-264
- Foibles of, 242-253
- Insolubilities confronting, 229-42
- Instruments of, 224-29
- Limitations of, 215-23
- Miracle and the supernatural, fancied antagonism of, with it, 164-82
- Neglect of, by Christians, 123
- "Popular," 269-72
- Process of unification in, 57-90
- Secchi, 75, 275, 293
- Seneca, 73, 161, 244; on prayer, 306
- Senses, human and animal, 224-9
- Seubert, 223
- Shakespeare, 61, 247
- Sophocles, 170
- Spallanzani, 227
- Spencer, Herbert, 296
- Spenser, Edmund, 158
- Spiller, 26, 133, 141; his deity "universal ether," 289; 295, 6, 9, 303, 326
- Spinoza, 75, 172, 295
- Spectrum analysis, 77 *sq.*, 135
- Strauss, 41, 166
- Suetonius, 60
- Taylor, Isaac, 211, 229
- Troyon on lake-dwellings, 29
- Tyndall, 169; 228, 266, 270, 299
- Urquhart, 31
- Virchow, 30; on ape-descent, 151, 2
- Virgil, 212
- Vogt, 30, 149, 255, 300
- Voltaire, 175
- Wallace, 316
- Whewell on generalization, 134; definition of life, 296
- Wilkinson, 291
- Winckler, 34
- Wordsworth on scientific progress, 1; 2, 116
- World, Entropy of, 8, 45, 160, 1, 292, 4







UNIVERSITY OF TORONTO  
LIBRARY

Do not  
remove  
the card  
from this  
Pocket.

Acme Library Co.

Under P

Made by

Author Bettex, F  
Title Modern science and Christianity; tr. Simpson.

95068

B Relig

*Specimen  
H. 224*



